Spring 2005
Environmental Sampling Report
for a Project To Construct and Operate
an LNG Receiving Terminal
in Long Island Sound
Long Island, New York

January 2006

Prepared for:

Broadwater Energy

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Public

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List of Abbreviations and Acronyms

ADCP	acoustic Doppler current profiler
ASP	Analytical Services Protocol
bcf	billion cubic feet
bcfd	billion cubic feet per day
BOD	biological oxygen demand
COD	chemical oxygen demand
DO	dissolved oxygen
DVM	data validation memoranda
°C	degrees Celsius
°F	degrees Fahrenheit
E & E	Ecology and Environment, Inc.
ft/s	feet per second
FERC	Federal Energy Regulatory Commission
FSRU	floating storage and regasification unit
IGTS	Iroquois Gas Transmission System
km	kilometers
LNG	liquefied natural gas
m	meter
m^2	square meter
m^3	cubic meter
m/s	meters per second

List of Abbreviations and Acronyms (cont.)

mg/kg	milligrams per kilogram
mg/L	milligrams per Liter
NYSDEC	New York State Department of Environmental Conservation
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
ppt	parts per thousand
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
STL	Severn Trent Laboratories
STV	shell and tube vaporization
TCL	Target Compound List
TIC	tentatively identified compound
TOGS	Technical and Operational Guidance Series
TSS	Total Suspended Solids
VOC	volatile organic compound
YMS	yoke mooring system

1 Introduction

Broadwater Energy, a joint venture between TCPL USA LNG, Inc., and Shell Broadwater Holdings LLC, is filing an application with the Federal Energy Regulatory Commission (FERC) seeking all of the necessary authorizations pursuant to the Natural Gas Act to construct and operate a marine liquefied natural gas (LNG) terminal and subsea pipeline for the importation, storage, regasification, and transportation of natural gas. The Broadwater LNG Project (the Project) will increase the availability of natural gas to the New York and Connecticut markets through an interconnection with the Iroquois Gas Transmission System (IGTS). The FERC application for the Project requires the submittal of 13 Resource Reports, with each report evaluating Project effects on a particular aspect of the environment.

The proposed Broadwater LNG terminal will be located in Long Island Sound (the Sound), approximately 9 miles (14.5 kilometers [km]) from the shore of Long Island in New York State waters, as shown on Figure 1-1. The LNG terminal facilitates the sea-to-land transfer of natural gas. It will be designed to receive, store, and regasify LNG at an average throughput of 1.0 billion cubic feet per day (bcfd) and will be capable of delivering a peak throughput of 1.25 bcfd. The Project will deliver the regasified LNG to the existing interstate natural gas pipeline system via an interconnection to the IGTS pipeline. Onshore facilities are discussed in the Onshore Facilities Resource Reports.

The proposed LNG terminal will consist of a floating storage and regasification unit (FSRU) that is approximately 1,215 feet (370 meters [m]) in length, 200 feet (60 m) in width, and rising approximately 80 feet (25 m) above the water line to the trunk deck. The FSRU's draft is approximately 40 feet (12 m). The freeboard and mean draft of the FSRU will generally not vary throughout operating conditions. This is achieved by ballast control to maintain the FSRU's trim, stability, and draft. The FSRU will be designed with a net storage capacity of approximately 350,000 cubic meters [m^3] of LNG (equivalent to 8 billion cubic feet [bcf] of natural gas) with base vaporization capabilities of 1.0 bcfd using a closed-loop shell and tube vaporization (STV) system. The LNG will be delivered to the FSRU in LNG carriers with cargo capacities ranging from approximately 125,000 m^3 up to a potential future size of 250,000 m^3 at the frequency of two to three carriers per week.

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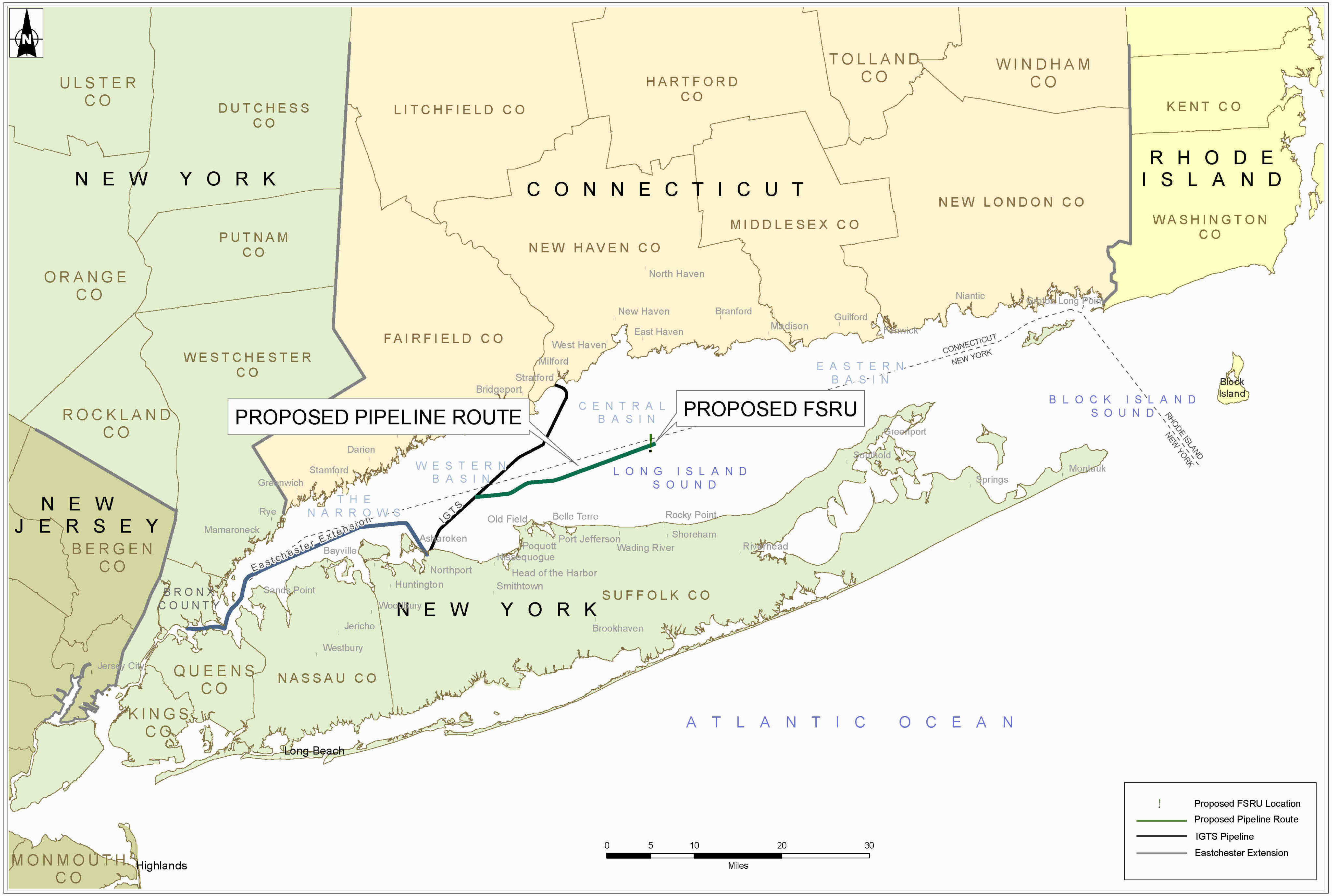

Source: ESRI StreetMap, 2002.

Figure 1-1 Proposed Broadwater Project Location in Long Island Sound

The FSRU will be connected to the send-out pipeline, which rises from the seabed and is supported by a stationary tower structure. In addition to supporting the pipeline, the stationary tower also serves the purpose of securing the FSRU in such a manner to allow it to orient in response to prevailing wind, wave, and current conditions (i.e., weathervane) around the tower. The tower, which is secured to the seabed by four legs, will house the yoke mooring system (YMS), allowing the FSRU to weathervane around the tower. The total area under the tower structure, which is of open design, will be approximately 13,180 square feet (1,225 square meters [m^2]).

A 30-inch-diameter natural gas pipeline will deliver the vaporized natural gas to the existing IGTS pipeline. It will be installed beneath the seafloor from the stationary tower structure to an interconnection location at the existing 24-inch-diameter subsea section of the IGTS pipeline, approximately 22 miles (35 km) west of the proposed FSRU site. To stabilize and protect the operating components, sections of the pipeline will be covered with engineered back-fill material or spoil removed during the lowering operation. Figure 1-1 presents the proposed pipeline route.

Ecology and Environment, Inc. (E & E) was contracted to support the environmental compliance requirements for the Project, including all permitting requirements. In order for the FERC application, permits, and, ultimately, the installation processes to move forward, it was necessary to evaluate the physical, chemical, and biological characteristics along the proposed pipeline route. Prior to undertaking the field activities, a sampling and analysis plan was prepared and submitted to regulatory agencies to provide them with the opportunity to comment on and, if necessary, request modifications to ensure adequacy of data for the agency review. The Sampling and Analysis Plan prepared for the Project is provided in Appendix A. The field sampling effort took place from April 15 through May 5, 2005. A summary of the field data collected as part of the sampling effort in Long Island Sound is provided below. Although geotechnical and archaeological data were collected and analyzed as part of this field effort, this report presents only the results supporting the biological and water quality evaluations for the Project. Geotechnical boring logs and cone penetrometer testing graphs are provided as appendices to Resource Report 7, Soils, and the results of archaeological investigations are presented in Resource Report 4, Cultural Resources.

This report discusses all environmental field parameters collected and data validation performed, including:

- • Sediment chemical contamination;
- • Physical and chemical water quality parameters (dissolved oxygen, salinity, temperature, and pH);

- • Benthic community analysis;
- • Drop camera video of the proposed pipeline route;
- • Acoustic Doppler current profiles; and
- • Quality assurance/quality control (QA/QC) data validation.

The appendices at the end of this report provide all field data collected as part of the sampling effort. Appendix A presents the Sampling and Analysis Pan developed for the data collection effort; Appendix B presents the laboratory results for all chemical parameters analyzed; Appendix C presents the water quality data collected from the Seabird CTD-Water Quality Meter; Appendix D presents the data sheets for benthic sample identification performed at each sample location; the CD included in Appendix E contains (1) a video used to record the bottom type at each sampling location and document the benthic community type and any organisms present and (2) a report summarizing the video findings; Appendix F presents the data collected by Acoustic Doppler Current Profilers (ADCPs), which were deployed for one complete tidal cycle as part of the field effort; and Appendix G presents the data validation memoranda (DVM) prepared for each chemical sample group processed for QA/QC review. Creation of this DVM is a critical part of the data review process and ensures the validity of collected data.

2 Sediment Sampling Results

The sediment sampling plan developed to evaluate the site-specific sediment conditions along the proposed pipeline route was designed specifically to address the New York State Department of Environmental Conservation's (NYSDEC's), Technical and Operational Guidance Series (TOGS) 5.1.9 for In-Water and Riparian Management of Sediment and Dredged Material (November 2004). The plan included analysis for several contaminants at a minimum interval of one sediment sample per mile along the proposed pipeline route, with adjustments to shorten or lengthen the interval applied to account for historical contamination data, field literature, and field-identified changes in sediment type, which may be indicative of changes in the level of potential contamination (*see* Figure 2-1). Sediment sampling was performed through a coring operation in which a 10-foot sediment core was collected from each sampling location using a vibracore unit mounted on a 100-foot vessel. Once retrieved, the sediment core soil types were classified, and sediment samples were collected from the core and shipped to a laboratory for chemical analysis. The tests performed, method, and numbers of samples collected are summarized in Table 2-1.

Once the laboratory analysis was completed, the results were received and the data were assessed by a rigorous QA/QC program in accordance with NYSDEC Analytical Services Protocol (ASP) requirements. Upon completion of the QA/QC review, positive results were evaluated and compared to the NYSDEC TOGS criteria (*see* Tables 2-2 and 2-3). The results are discussed below, and the complete analytical results are provided in Appendix B.

Metals

Every sediment sample was analyzed for the Target Compound List (TCL) metals identified on Table 2-1. Positive results were obtained for several metals; however, none of the metals values exceeded their respective TOGS criterion. Five metals (antimony, cadmium, selenium, silver, and thallium) were not detected in any of the sediment samples collected, and as such, were not evaluated on Table 2-2.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs were not detected in any of the sediment samples collected along the proposed pipeline route.

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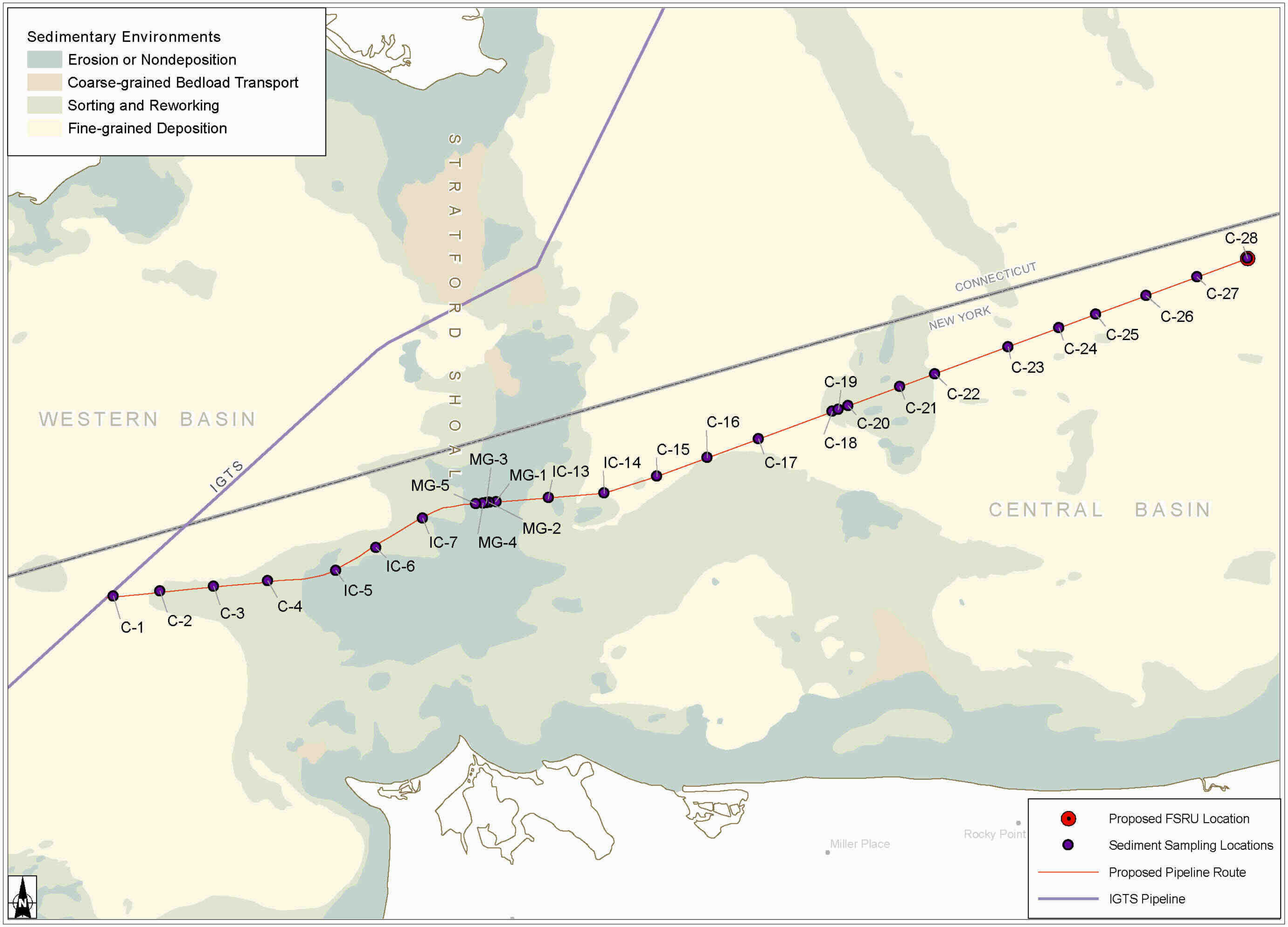

Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000.

0 1 2 4
Miles

Figure 2-1 Sediment Sampling Locations
Spring 2005 Field Survey

BW000209

Table 2-1 Summary of Sediment Chemical Analyses

Test Description	EPA Method Number	Number of Samples Collected
Arsenic as TCL Metals	EPA 6010B	28
Cadmium as TCL Metals	EPA 6010B	28
Copper as TCL Metals	EPA 6010B	28
Lead as TCL Metals	EPA 6010B	28
Mercury	EPA 6010B	28
Benzene	EPA 8021B or 8260B	28
Total BTX	EPA 8021B or 8260B	28
Total PAHs (sum of Target Compound List PAH)	EPA 8270C	28
Sum of DDT+DDE+DDD	EPA 8081A	28
Mirex	EPA 8081A	28
Chlordane	EPA 8081A	28
Dieldrin	EPA 8081A	28
PCBs (sum of aroclors)	EPA 8082	28
Dioxin (Toxicity Equivalency Total calculated from PCDD/PCDF congeners)	EPA 1613B	8
Total Organic Carbon	Lloyd Kahn	28

Pesticides

Pesticides were not detected in any sediment samples collected along the proposed pipeline route.

Polychlorinated Biphenyls (PCBs)

PCBs were not detected in any sediment samples collected along the proposed pipeline route.

Volatile Organic Compounds (VOCs)

Positive results for VOCs included identification of acetone in sample C-24 and dichlorodifluoromethane in sample C-3D. However, these contaminants are likely attributable to sample handling procedures. Positive results for VOCs also included identification of toluene in all but four samples. Toluene values ranged from 0.001 milligrams per kilogram(mg/kg) to 0.13 mg/kg; however, none of these values exceeded the TOGS criterion of 0.96 mg/kg.

Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-1 04/29/05	C-2 04/22/05	C-3 04/28/05	C-3D 04/28/05	C-4 04/22/05
Volatiles (ppm)							
Acetone	NA		0.025 U	0.023 U	0.025 U	0.025 U	0.025 U
Dichlorodifluoromethane	NA		0.0050 U	0.0050 U	0.0050 U	0.0010 J	0.0050 U
Toluene	0.96		0.0030 J	0.013	0.0040 J	0.054	0.027
Metals (ppm)							
Aluminum - Total	NA		7500	5670	7550	4900	7900
Arsenic - Total	14		5.4	2.4 J	3.6	4.3	5.0 J
Barium - Total	NA		23.7 J	15.9 J	22.6 J	14.8 J	23.6 J
Beryllium - Total	NA		0.39	0.30	0.40	0.25	0.40
Calcium - Total	NA		2350 J	1200 J	2070 J	1410 J	2950 J
Chromium - Total	NA		16.3	12.0 J	16.0	12.2	26.5 J
Cobalt - Total	NA		6.5	4.1 J	6.3	4.8	7.0 J
Copper - Total	33		8.1	4.6 J	7.8	10.6	28.8 J
Iron - Total	NA		15100 J	10000	14600 J	9480 J	15300
Lead - Total	33		5.9	3.7	5.7	6.5	18.6
Magnesium - Total	NA		5500 J	3730 J	5460 J	3360 J	5490 J
Manganese - Total	NA		409 J	175	326 J	214 J	419
Sodium - Total	NA		5750	4660 J	4940	3120	5710 J
Nickel - Total	NA		11.8	8.3 J	11.9	8.8	13.4 J
Potassium - Total	NA		2640	1970 J	2580	1550	2580 J
Vanadium - Total	NA		22.5 J	14.3 J	22.9 J	14.8 J	21.6 J
Zinc - Total	NA		33.5	23.1 J	34.3	30.4	70.7 J
Mercury - Total	0.2		0.016 U	0.011 U	0.026	0.063	0.040
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		14000	7920	6370	7950	6940

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc
2005

Public

Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-4D 04/22/05	IC-5 04/29/05	IC-6 04/27/05	IC-7 04/27/05	MG-5 04/21/05
Volatiles (ppm)							
Acetone	NA		0.021 U	0.024 U	0.021 U	0.024 U	0.022 U
Dichlorodifluoromethane	NA		0.0040 U	0.0050 U	0.0040 U	0.0050 U	0.0040 U
Toluene	0.96		0.0010 J	0.049	0.022	0.0040 J	0.010
Metals (ppm)							
Aluminum - Total	NA		6960	7880	4090	5820	1840
Arsenic - Total	14		5.2 J	5.6	3.0 J	3.7 J	1.2 J
Barium - Total	NA		21.4 J	21.0	12.7 J	29.6 J	4.2 J
Beryllium - Total	NA		0.36	0.42	0.21 J	0.29 J	0.11 U
Calcium - Total	NA		2570 J	4540	1680	6230	725 J
Chromium - Total	NA		15.4 J	17.8	8.3 J	11.6 J	5.0 J
Cobalt - Total	NA		6.4 J	8.5	4.3 J	5.9 J	1.7 J
Copper - Total	33		9.0 J	11.2	3.5 J	10.3 J	5.8 J
Iron - Total	NA		13800	16800	8000	11800	3790
Lead - Total	33		6.2	8.1	3.1 J	4.6 J	3.7
Magnesium - Total	NA		5200 J	5370	2830	4100	1180 J
Manganese - Total	NA		312	284	163	377	60.4
Sodium - Total	NA		4690 J	5270	2810	4330	2070 J
Nickel - Total	NA		11.4 J	14.3	7.1 J	10.4 J	3.2 J
Potassium - Total	NA		2240 J	2860	1340 J	1650 J	639 J
Vanadium - Total	NA		18.5 J	22.0	11.2 J	16.6 J	5.5 J
Zinc - Total	NA		34.5 J	43.7	18.1 J	28.0 J	15.5 J
Mercury - Total	0.2		0.021	0.014	0.011 U	0.017 U	0.012 U
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		8640	4330	4310	7040	665

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: / Date:	MG-3 04/20/05	IC-13 04/30/05	IC-14 04/30/05	C-15 04/26/05	C-16 04/26/05
Volatiles (ppm)							
Acetone	NA		0.023 U	0.024 U	0.024 U	0.023 U	0.025 U
Dichlorodifluoromethane	NA		0.0040 U	0.0050 U	0.0050 U	0.0040 U	0.0050 U
Toluene	0.96		0.0080	0.0020 J	0.0040 J	0.0060	0.0030 J
Metals (ppm)							
Aluminum - Total	NA		2840	5180	12000	5240 J	6810 J
Arsenic - Total	14		1.3 U	4.6	6.4	4.2	5.9
Barium - Total	NA		9.8 J	13.8	35.2	15.3	18.8
Beryllium - Total	NA		0.14	0.30	0.60	0.26	0.33
Calcium - Total	NA		704 J	3520	4230	1700 J	2580 J
Chromium - Total	NA		5.5 J	14.0	27.5	14.2	14.5
Cobalt - Total	NA		1.6 J	5.3	11.7	4.4	5.9
Copper - Total	33		6.4 J	10.9	15.6	18.3	6.2
Iron - Total	NA		4230	10900	23800	10000 J	13900 J
Lead - Total	33		2.4	7.7	11.0	9.6	4.6
Magnesium - Total	NA		1200 J	3370	8740	3500 J	4900 J
Manganese - Total	NA		51.3	186	546	175 J	244 J
Sodium - Total	NA		1730 J	5190	7770	3680	4550
Nickel - Total	NA		3.9 J	8.1	18.6	8.6	11.1
Potassium - Total	NA		843 J	1940	4000	1670 J	2220 J
Vanadium - Total	NA		7.0 J	18.0	32.5	14.1	18.4
Zinc - Total	NA		11.2 J	34.4	62.1	41.5	28.9
Mercury - Total	0.2		0.012 U	0.012	0.015	0.036	0.020
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		644 U	1640	3990	7690	9510

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: / Date:	C-16D 04/26/05	C-17 04/24/05	C-18 04/19/05	C-19 04/19/05	C-20 04/21/05
Volatiles (ppm)							
Acetone	NA		0.025 U	0.025 U	0.029 U	0.025 U	0.024 U
Dichlorodifluoromethane	NA		0.0050 U	0.0050 U	0.0060 U	0.0050 U	0.0050 U
Toluene	0.96		0.0060	0.0080	0.075	0.016	0.0050
Metals (ppm)							
Aluminum - Total	NA		8360 J	8030 J	1230	1630	2940
Arsenic - Total	14		7.6	4.8	1.3 U	1.2 U	2.3 J
Barium - Total	NA		23.2	22.5 J	3.5 J	5.7 J	8.0 J
Beryllium - Total	NA		0.42	0.42	0.13 U	0.14	0.17
Calcium - Total	NA		2650 J	2520 J	241 J	540 J	783 J
Chromium - Total	NA		18.3	18.2	2.6 J	4.3 J	8.4 J
Cobalt - Total	NA		6.7	5.9	1.6	1.9	2.9 J
Copper - Total	33		11.7	9.1	2.7	3.4	7.8 J
Iron - Total	NA		16300 J	14900 J	3290 J	4170 J	7100
Lead - Total	33		7.4	6.5	2.2	2.3	4.2
Magnesium - Total	NA		5560 J	5190 J	790	876	1760 J
Manganese - Total	NA		249 J	246 J	35.3 J	51.5 J	78.7
Sodium - Total	NA		6010	5820	1860	2980	2110 J
Nickel - Total	NA		13.6	12.6	2.6	2.8	5.5 J
Potassium - Total	NA		2700 J	2680 J	288	505	940 J
Vanadium - Total	NA		23.1	21.7	6.2	9.3	9.2 J
Zinc - Total	NA		42.5	37.1	5.6	9.5	20.3 J
Mercury - Total	0.2		0.017 U	0.016 U	0.011 U	0.010 U	0.012
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		9910	11100	10400	7100	2440

Key:
J = Estimated value.
U = Not detected at the reported value.
ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-21 05/01/05	C-22 05/01/05	C-23 05/03/05	C-24 05/03/05	C-25 05/04/05
Volatiles (ppm)							
Acetone	NA		0.024 U	0.024 U	0.025 U	0.022 J	0.025 U
Dichlorodifluoromethane	NA		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Toluene	0.96		0.020	0.13	0.0050 U	0.0050	0.0020 J
Metals (ppm)							
Aluminum - Total	NA		6730	12400	12000	11500	11900
Arsenic - Total	14		3.6	7.1	5.4	6.5	6.3
Barium - Total	NA		12.6	36.7	34.4	32.8	34.0
Beryllium - Total	NA		0.33	0.66	0.58	0.55	0.59
Calcium - Total	NA		1880	7040	3820	3780	3220
Chromium - Total	NA		11.6	29.2	27.3	24.6	25.6
Cobalt - Total	NA		6.7	10.9	8.1	7.9	8.0
Copper - Total	33		15.1	13.9	14.4	12.0	10.6
Iron - Total	NA		13600	24900	21000	20200	21000
Lead - Total	33		9.8	11.7	9.7	7.7	7.4
Magnesium - Total	NA		4010	9220	7640	7090	7500
Manganese - Total	NA		167	475	329	324	291
Sodium - Total	NA		3990	7870	8440	8370	8840
Nickel - Total	NA		10.8	18.0	17.9	17.4	17.6
Potassium - Total	NA		1780	4460	3990	3820	4100
Vanadium - Total	NA		22.2	34.4	30.6	30.9	30.2
Zinc - Total	NA		36.4	57.4	53.9	46.6	47.6
Mercury - Total	0.2		0.011 U	0.012 U	0.022	0.016 U	0.019 U
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		2910	12400	11100	10700	9780

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

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Table 2-2 Summary of Positive Analytical Results for Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-26 05/03/05	C-27 05/02/05	C-28 05/02/05
Volatiles (ppm)					
Acetone	NA		0.024 U	0.023 U	0.023 U
Dichlorodifluoromethane	NA		0.0050 U	0.0050 U	0.0050 U
Toluene	0.96		0.0050 U	0.0050 U	0.0050 U
Metals (ppm)					
Aluminum - Total	NA		11000	10700	10700
Arsenic - Total	14		6.9	6.7	7.1
Barium - Total	NA		33.1	31.7	30.4
Beryllium - Total	NA		0.54	0.52	0.50
Calcium - Total	NA		2680	2830	3600
Chromium - Total	NA		24.8	23.3	23.1
Cobalt - Total	NA		7.7	7.6	7.3
Copper - Total	33		12.4	10.4	13.2
Iron - Total	NA		20000	19900	18800
Lead - Total	33		8.5	6.7	8.1
Magnesium - Total	NA		6910	6690	6500
Manganese - Total	NA		308	272	268
Sodium - Total	NA		7910	6670	7510
Nickel - Total	NA		16.9	16.3	16.1
Potassium - Total	NA		3790	3570	3450
Vanadium - Total	NA		28.6	28.3	27.0
Zinc - Total	NA		48.1	44.2	47.0
Mercury - Total	0.2		0.017 U	0.015 U	0.017 U
Total Organic Carbon (ppm)					
Total Organic Carbon	NA		10400	10000	8260

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 2-3 Summary of Positive Analytical Results for Dioxin in Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-1-D3-4 04/29/05	C-4-D2-3 04/22/05	C-4D-D2-3 04/22/05	IC-7-D2-3 04/27/05	IC-13-D0-1 04/30/05
SM1613B (ppm)							
1,2,3,7,8-PeCDD	NA		0.0000050 U	0.00000024 J	0.0000050 U	0.00000027 J	0.00000041 J
1,2,3,4,7,8-HxCDD	NA		0.00000010 J	0.00000024 J	0.0000050 U	0.0000050 U	0.00000060 J
1,2,3,6,7,8-HxCDD	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.00000059 J	0.0000014 J
1,2,3,7,8,9-HxCDD	NA		0.0000050 U	0.00000072 J	0.0000050 U	0.0000011 J	0.0000016 J
1,2,3,4,6,7,8-HpCDD	NA		0.0000026 J	0.0000084 J	0.0000027 J	0.000017	0.000029
OCDD	NA		0.000057 J	0.00021 J	0.000065 J	0.00041 J	0.00032 J
2,3,7,8-TCDF	NA		0.00000030 J	0.0000010 U	0.0000010 U	0.00000015 J	0.0000034
1,2,3,7,8-PeCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.0000014 J
2,3,4,7,8-PeCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.0000014 J
1,2,3,4,7,8-HxCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.00000014 J	0.0000021 J
1,2,3,6,7,8-HxCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.000000094 J	0.00000096 J
2,3,4,6,7,8-HxCDF	NA		0.0000050 U	0.00000010 J	0.0000050 U	0.0000050 U	0.0000010 J
1,2,3,4,6,7,8-HpCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000012 J	0.000015 J
1,2,3,4,7,8,9-HpCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.00000080 J
OCDF	NA		0.000010 U	0.000010 U	0.000010 U	0.000010 U	0.000033 J
Dioxin(Toxic Equivalency Total)	0.0000045		0.000000123	0.00000052	0.000000092	0.0000009344	0.000002882

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

D - discrete depth interval for sample collection

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

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Table 2-3 Summary of Positive Analytical Results for Dioxin in Sediment Samples, May 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-20-D0-1 04/20/05	C-24-D5-6 05/03/05	C-28-D2-3 05/02/05	ENV-3-D1-3 04/17/05	ENV-3D-D1-3 04/17/05
SM1613B (ppm)							
1,2,3,7,8-PeCDD	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.000000070 U	0.000000065 U
1,2,3,4,7,8-HxCDD	NA		0.0000050 U	0.00000023 J	0.00000019 J	0.00000010 U	0.000000068 U
1,2,3,6,7,8-HxCDD	NA		0.00000054 J	0.00000040 J	0.00000028 J	0.000000097 U	0.000000066 U
1,2,3,7,8,9-HxCDD	NA		0.00000098 J	0.00000097 J	0.00000079 J	0.00000010 U	0.000000067 U
1,2,3,4,6,7,8-HpCDD	NA		0.000013	0.000017	0.0000095	0.000011 J	0.0000045 J
OCDD	NA		0.00018 J	0.00040 J	0.00025	0.00026 J	0.000095 J
2,3,7,8-TCDF	NA		0.0000010 U	0.0000010 U	0.0000010 U	0.00000016 U	0.00000013 U
1,2,3,7,8-PeCDF	NA		0.00000029 J	0.0000050 U	0.0000050 U	0.000000070 U	0.000000065 U
2,3,4,7,8-PeCDF	NA		0.00000048 J	0.0000050 U	0.0000050 U	0.000000064 U	0.000000057 U
1,2,3,4,7,8-HxCDF	NA		0.00000060 J	0.0000050 U	0.0000050 U	0.000000070 U	0.000000047 U
1,2,3,6,7,8-HxCDF	NA		0.00000053 J	0.0000050 U	0.0000050 U	0.000000068 U	0.000000045 U
2,3,4,6,7,8-HxCDF	NA		0.00000033 J	0.0000050 U	0.0000050 U	0.000000080 U	0.000000050 U
1,2,3,4,6,7,8-HpCDF	NA		0.0000044 J	0.0000012 J	0.00000081 J	0.000000099 U	0.000000074 U
1,2,3,4,7,8,9-HpCDF	NA		0.00000039 J	0.0000050 U	0.0000050 U	0.00000013 U	0.000000098 U
OCDF	NA		0.000010 J	0.000010 U	0.0000014 J	0.00000015 U	0.000000077 U
Dioxin(Toxic Equivalency Total)	0.0000045		0.0000009204	0.000000742	0.0000004805	0.00000037	0.00000014

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

D - discrete depth interval for sample collection

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Dioxin

Positive results for dioxin included identification of PCDD (dioxin) and PCDF (furan) congeners in samples that were collected from a discrete depth interval in the sediment core. Discrete depth interval sampling for dioxin was implemented as part of the sediment sampling program in order to target the area of highest clay content in the sediment cores that were analyzed for dioxin. The areas of highest clay content were identified for analysis because dioxins and other contaminants adhere to sediments with a high clay content more readily than to sands, gravel, and coarser grained sediments. However, none of the dioxin or furan values resulted in a toxicity equivalency for 2,3,7,8-TCDD that exceeded the TOGS criterion.

3 Water Quality Sampling Results

The water quality of Long Island Sound is influenced by many physical factors, including physico-chemical inputs and geographic characteristics. Water quality sampling was performed to obtain data regarding background conditions in the water column. The data were then compared to known water quality values for Long Island Sound, including parameters for physical, chemical, and biological components of the water column. To evaluate the physical quality of the water in the vicinity of the proposed pipeline route, chemical and biological water quality samples were collected from eight sampling locations. These sampling locations were collocated with sediment sampling locations and collected as part of the same field effort. Water quality samples were collected from locations C-1, C-3, IC-6, MG-5, C-15, C-19, C-27, and C-28 along the proposed pipeline route. In addition, data on the physical parameters of water quality were collected from each sediment sampling location. The results for each sampling group (physical, chemical, and biological) are summarized below.

Physical Parameters of Water Quality

Readings for dissolved oxygen, salinity, temperature, and pH were collected at 597 locations along the entire pipeline route using a Seabird-CTD water quality meter. These readings were collected at 5-foot intervals continuously throughout the water column at 28 sampling locations collocated with sediment sampling locations along the pipeline route (*see* Figure 2-1). The results of the readings from the water quality meter are summarized below. The complete data output from the Seabird meter is provided in Appendix C.

Dissolved Oxygen (DO)

Water quality in Long Island Sound is affected by several direct and indirect sources of pollution. Input from these sources contributes to nitrogen pollution, sediment contamination, and habitat degradation and loss.

Hypoxia, or low levels of DO, is considered the most serious water quality issue in Long Island Sound Hypoxia occurs primarily during the summer, when the waters of the Sound stratify, and high nutrient loading results in depressed DO levels at bottom depths within the Sound. Stratification prevents the mixing of oxygen-rich surface waters of the Sound with oxygen-depleted bottom waters. High nutrient inputs have been identified as the main cause of hypoxia in the

Sound, with the highest inputs associated with the large urbanized areas in the New York City area.

Based on field survey results, DO values ranged from 4.96 milligrams per liter (mg/L) to 11.1 mg/L for samples collected at a depth of 5 feet; 8.92 mg/L to 11.33 mg/L at depths of 20 to 40 feet; 8.96 mg/L to 11.20 mg/L at depths of 45 to 65 feet; 8.91 mg/L to 10.34 mg/L at depths of 70 to 90 feet; and 8.92 mg/L to 9.63 mg/L at depths of 100 to 130 feet. The average measured DO value for the entire Project area was 9.52 mg/L. The field DO values support the historical data collected for the Sound.

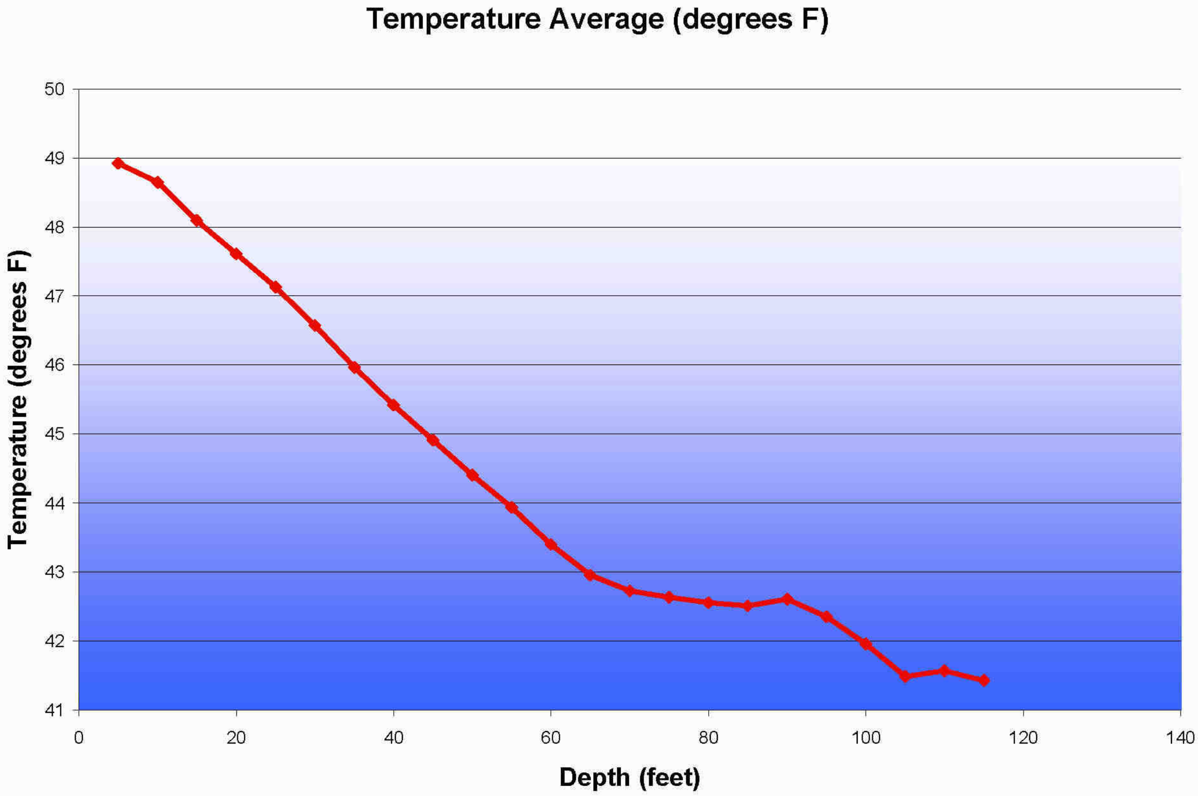
In addition to examining DO as an independent value, DO concentrations were compared to water temperature data from the same sample location and depth to determine whether a trend exists. Based on this comparison, the data show that DO was not significantly affected by decreases in water temperature. However, any impact that temperature may have on DO is likely not apparent in this data set since it was collected in the months of April and May and does not show any major stratification in the water column, which is related to the warmer temperatures and high nutrient loading that often occurs in the later summer months.

Temperature

Water temperatures in Long Island Sound average 3.6 degrees Celsius (°C) (38.5 degrees Fahrenheit [°F]) in January, with temperatures in the western Sound approximately 1°C cooler on average than those in the eastern Sound. The average temperature in Long Island Sound does not exceed 10°C (50°F) until May. During July, August, and September, the Sound exhibits the highest water temperatures for the year. It is also only during this time that a significant temperature gradient exists from the top to the bottom of the water column. Temperatures at or near the surface range from 19°C to 25°C (65°F to 77°F), with temperatures at depths (65 feet to 98 feet [20 m to 30 m]) measuring as much as 5°C cooler.

Weather patterns significantly affect temperatures within Long Island Sound. Hot, dry summers with mild breezes allow the Sound to thermally stratify, sealing off the bottom layer of water below a thermocline. By fall, climate conditions change, allowing more complete mixing of the waters within Long Island Sound. During the fall, temperatures within the Sound are relatively consistent from top to bottom, averaging 18°C (65°F) in October, 13°C (55°F) in November, and 8°C (45°F) in December.

Although the temperature data collected in the field reflect only a snapshot of the temperature regime in the Sound, it depicts the temperature gradation from top to bottom. No identifiable trends were apparent from east to west across the length of the Project area. The data collected is supportive of the historical data trends for the Sound. Temperature data were compiled and averaged for each 5-foot (1.5-m) depth interval and plotted in Figure 3-1. The temperature pattern shows a decrease of approximately 1ºF for every 20 feet (6.1 m) of depth.



Note: Temperature data collected between April 15 and May 5, 2005.

Figure 3-1 Average Temperatures Measured during the Spring 2005 Field Survey

Salinity

Long Island Sound receives hydrologic inputs from both saline and freshwater sources. Due to its size and the differing hydrologic inputs, salinity varies throughout the Sound. The Sound is a unique estuary as it has two connections with the Atlantic Ocean. The eastern portion of Long Island Sound maintains fairly constant salinity levels via input from the Atlantic Ocean through Block Island Sound, with average salinities on the order of 27 parts per thousand (ppt) to 30 ppt. In the western portion of Long Island Sound, lower-salinity water enters from New York Harbor through the East and Harlem Rivers. Within the western portion of Long Island Sound, salinity variations are more evident due to the seasonal influx of freshwater from adjacent uplands. Due to the significant inflows of freshwater, salinity levels in the western portion of the Sound may be 1 ppt to 2 ppt below levels in the eastern portion of the Sound. The majority of the freshwater content of the Sound, approximately 90%, comes from the Connecticut, Housatonic, and Thames Rivers.

Field survey results indicated that salinity values are consistent throughout the water column and vary only slightly from east to west along the pipeline route, with a minimum value of 24.73 ppt and a maximum value of 26.63 ppt. The average salinity for all 597 sample readings was 25.74 ppt. This value is much lower than seawater in the open ocean, which has an average salinity of 35 ppt, but it is consistent with reported salinities for the Sound. The decreased salinities in the Sound are due to the physical structure of the Sound as a large inlet with significant freshwater inputs from the surrounding riverine systems.

pH

Data for pH was collected in conjunction with other water quality parameters using the Seabird-CTD water quality meter along the proposed pipeline route. Analysis of the data across all stations and depths results in an average pH value of 8.49, with a minimum of 7.35 and a maximum of 8.84. This variability of the site-specific pH values was insignificant, with a standard deviation of only 0.089 for the entire data set. These values indicate that the pH of the water column is consistent throughout the Project area.

Chemical and Biological Water Quality

Chemical and biological water quality samples were collected at eight locations along the sampling route (C-1, C-3, IC-6, MG-5, C-15, C-19, C-27, and C-28), at approximately every third sampling station, for an average interval of every 3 miles. Three discrete depths were sampled at each of the eight sampling locations: just below the water surface (<5 feet [1.5 m]), at the midpoint of the water column, and a bottom water column sample (5 feet [1.5 m] from the bottom). The sample locations are indicated on Figure 3-2.

Samples were collected in 1-liter volumes from each of the discrete depths, with the exception of samples for biological oxygen demand, which were collected in 250-milliliter amber glass bottles to protect the integrity of the samples until analysis. Samples were sent to the laboratory on the same day as sample collection due to short holding times between collection and analysis. A summary of the water quality analyses performed is presented in Tables 3-1 and 3-2.

Once the laboratory analysis was completed, the results were received and the data were assessed by a rigorous QA/QC program in accordance with NYSDEC ASP requirements. Upon completion of the QA/QC review, positive results were evaluated and compared to historical water quality data from the Sound. The water quality sample results are presented in Table 3-3 and discussed below. The complete analytical results are presented in Appendix B.

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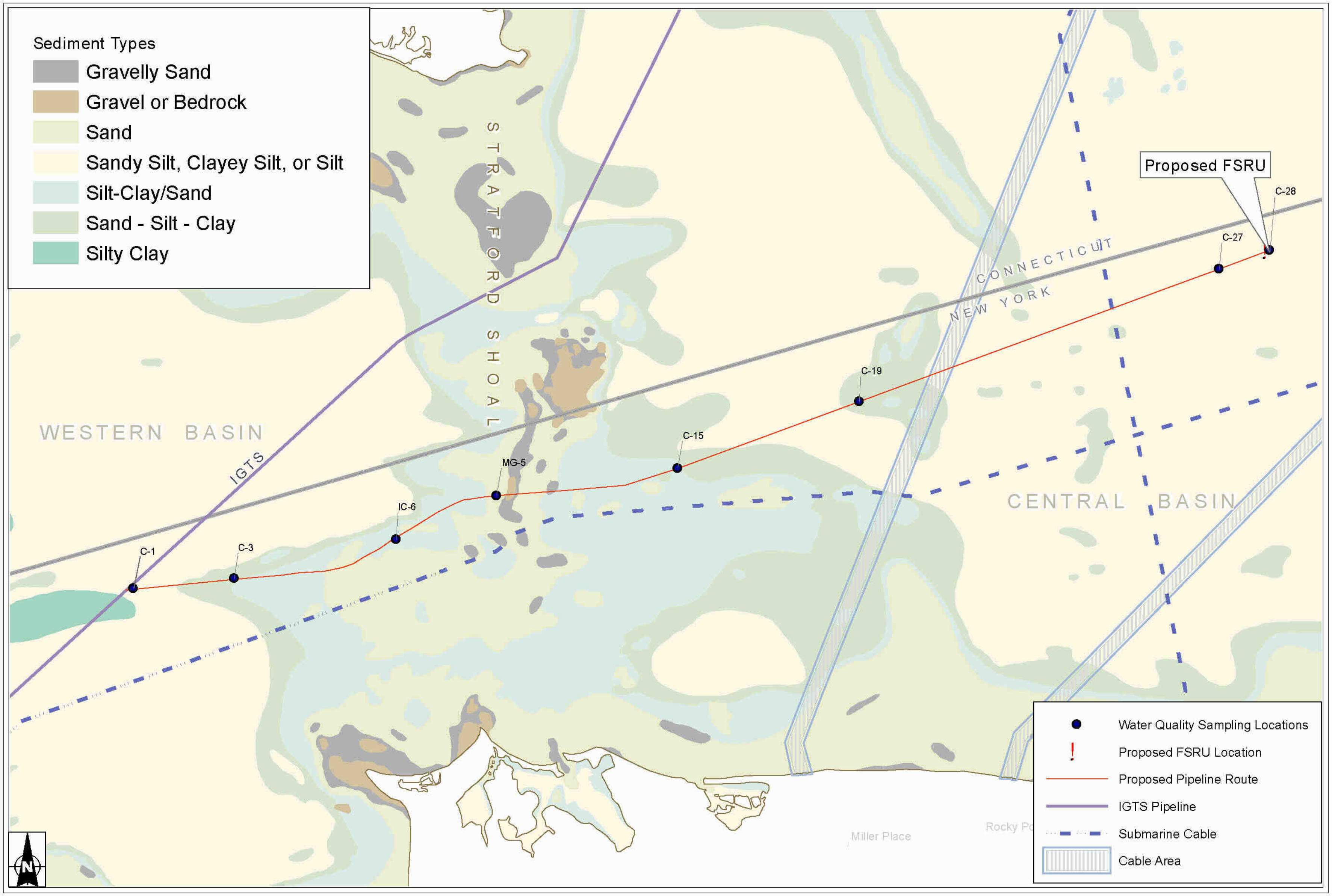

Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000;
Broadwater Surveys conducted in April/May 2005.

0 2 4 8
Miles

Figure 3-2 Water Quality Sampling Locations
Spring 2005 Field Survey

BW000224

Table 3-1 Summary of Water Sample Analyses - Biological

Test Description	EPA Method Number	Number of Samples Collected
Total Suspended Solids	EPA 160.2	8
Colloidal/Settleable Solids	EPA 160.5	8
Fecal Coliform Bacteria	SM4221C	8
Total Coliform Bacteria	SM4221B	8
Biological oxygen demand	SM5210B	8

Table 3-2 Summary of Water Sample Analyses – Chemical

Test Description	EPA Method Number	Number of Samples Collected
Ammonia (as N)	EPA 350.3	8
Chlorides	EPA 300	8
Total Organic Nitrogen	SM4500-NC	8
Total Phosphorus	EPA 365.3	8
Chemical Oxygen Demand	EPA 410.1	8
Sulfate	EPA 300	8
Total Residue	EPA 160.3	8

Biological Parameters

Biological parameters are often evaluated to determine the baseline water quality of a given water body, since parameters such as biological oxygen demand (BOD) and Total Suspended Solids (TSS) may be affected by negative inputs such as raw sewage and other waste products. Water samples were collected and tested for the biological parameters identified in Table 3-1. The results for TSS, BOD, and colloidal/settleable solids fell within the normal range for water quality. A BOD value was detected in only 1 of the 8 water quality samples, at a value of 10.7 mg/L, which is not an elevated level. High readings are generally associated with values in the hundreds or thousands.

Fecal Coliform

Bacteria levels, specifically the levels of *Clostridium perfringens*, can be viewed representatively as correlating to elevated nutrient inputs in depositional areas that may be susceptible to sedimentation and the accumulation of contaminated sediments. This bacterium functions as a tracer and indicator of sewage input, which is generally a significant source of metal pollutants. Therefore, the presence of *Clostridium* spores in sediments provides a record of sewage input into an ecosystem.

In order to evaluate bacteria levels along the proposed pipeline route that may be indicative of increased sewage inputs or elevated nutrient inputs, Broadwater collected water quality samples for fecal coliform and total coliform bacteria during

Table 3-3 Summary of Positive Analytical Results for Water Quality Samples, May 2005

Analyte	Screening Criteria (1)	C-1-DS-W 04/29/05	C-1-DM-W 04/29/05	C-1-DB-W 04/29/05	C-3-DS-W 04/22/05	C-3-DM-W 04/22/05	C-3-DB-W 04/22/05
Anions (mg/L)							
Chloride	NA	22400	24200	25500	21900	28300	25800
Sulfate	NA	2860	3350	3680	3080	3930	3500
General Analytical (mg/L)							
Ammonia	NA	0.020 U	0.025	0.035	0.020 U	0.020 U	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	838 J	1070 J	1020 J	739 J	843 J	739 J
Colloidal Solids	NA	8.0	4.0 U	4.0	13.0 J	4.0 UJ	5.0 J
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U	13.0 J	10 UJ	10 UJ
Total Organic Nitrogen	NA	0.63	0.72	0.61	0.16	0.21	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	27600	28700	28500	29600	32900	28900

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter

S - Surface, M - Middle, B - Bottom

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

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Table 3-3 Summary of Positive Analytical Results for Water Quality Samples, May 2005

Analyte	Screening Criteria (1)	IC-6-DS-W 04/27/05	IC-6-DM-W 04/27/05	IC-6-DB-W 04/27/05	MG-5D-DS-W 04/21/05	MG-5D-DM-W 04/21/05
Anions (mg/L)						
Chloride	NA	21300	26900	27400	24900	26500
Sulfate	NA	2640	3310	3380	3360	3250
General Analytical (mg/L)						
Ammonia	NA	0.020 U	0.020 U	0.027	0.020 U	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	634 J	1600 J	1830 J	659 J	782 J
Colloidal Solids	NA	4.0 U	4.0 U	4.0 U	4.0 J	33.0 J
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U	53.0 J	17.0 J
Total Organic Nitrogen	NA	0.69	0.71	0.63	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	- -	- -	- -	40800	30900

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter

S - Surface, M - Middle, B - Bottom

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 3-3 Summary of Positive Analytical Results for Water Quality Samples, May 2005

Analyte	Screening Criteria (1)	MG-5-DB-W 04/21/05	C-15-DS-W 04/26/05	C-15-DM-W 04/26/05	C-15-DB-W 04/26/05	C-19-DS-W 04/19/05
Anions (mg/L)						
Chloride	NA	24600	23000	28800	32400	24600
Sulfate	NA	3800	3100	3960	4180	3000
General Analytical (mg/L)						
Ammonia	NA	0.020 U	0.020 U	0.020 U	0.052	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	843 J	1850 J	3430 J	1540 J	890 J
Colloidal Solids	NA	12.0 J	21.0	6.0	5.0	28.0 J
Non-Filterable Residue (103 C)	NA	12.0 J	21.0	10 U	10 U	28.0 J
Total Organic Nitrogen	NA	0.15	0.80	0.57	0.62	0.18
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	36800	- -	- -	- -	26500

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter

S - Surface, M - Middle, B - Bottom

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 3-3 Summary of Positive Analytical Results for Water Quality Samples, May 2005

Analyte	Screening Criteria (1)	C-19-DM-W 04/19/05	C-19-DB-W 04/19/05	C-27-DS-W 05/02/05	C-27-DM-W 05/02/05	C-27-DB-W 05/02/05
Anions (mg/L)						
Chloride	NA	23700	28500	21300	29400	30700
Sulfate	NA	2980	3500	2880	3970	4340
General Analytical (mg/L)						
Ammonia	NA	0.038	0.060	0.020 U	0.026	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	10.7	2.0 U
Chemical Oxygen Demand	NA	815 J	382 J	701 J	748 J	776 J
Colloidal Solids	NA	29.0 J	39.0 J	4.0 U	4.0 U	11.0
Non-Filterable Residue (103 C)	NA	29.0 J	39.0 J	10 U	10 U	11.0
Total Organic Nitrogen	NA	0.10 U	0.17	0.10 U	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	27800	28700	536	28000	28200

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter

S - Surface, M - Middle, B - Bottom

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

Table 3-3 Summary of Positive Analytical Results for Water Quality Samples, May 2005

Analyte	Screening Criteria [(1)]	C-28-DS-W 05/02/05	C-28-DM-W 05/02/05	C-28-DB-W 05/02/05
Anions (mg/L)				
Chloride	NA	25500	32800	25200
Sulfate	NA	3520	4620	3520
General Analytical (mg/L)				
Ammonia	NA	0.020 U	0.020 U	0.026
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	611 J	715 J	646 J
Colloidal Solids	NA	4.0 U	4.0 U	4.0 U
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U
Total Organic Nitrogen	NA	0.10 U	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.013
Total Residue (103 C)	NA	27100	28300	25600

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter

S - Surface, M - Middle, B - Bottom

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Source: Ecology and Environment, Inc 2005

Public

the field effort. The total coliform bacteria test is a primary indicator of "potability," or suitability for consumption as drinking water. Because the presence of coliform bacteria is most closely related to sewage discharges, the concentration of total coliform bacteria can serve as an indication of the possible presence of other disease-causing bacteria.

Samples were collected in 1-liter volumes from each of the discrete depths and, due to the short sample storage time, sent to the laboratory on the same day as sample collection for immediate analysis of total and fecal coliform. The results of the analysis indicated no detectable fecal coliform or total coliform units. The results for all locations were <1.1 coliform units per 100 ml, which is the measurable limit for the presence of the coliform bacteria. The data indicate that the Long Island Sound waters in the Project area are not impacted by sewage or nutrient inputs from the surrounding areas. The results of the laboratory analysis are presented in Appendix C.

Chemical Parameters

Chemical parameters also are evaluated to determine the baseline water quality of a given water body, since parameters such as total phosphorus and nitrogen are often affected by negative inputs such as agricultural runoff. Water samples were collected and tested for the chemical parameters identified in Table 3-2. The results of the chemical water quality analysis confirm that the water quality parameters along the proposed pipeline route fall in the range of the natural conditions present in the eastern basin of Long Island Sound. Water quality in this area is generally not impacted by contaminant inputs from the surrounding coastlines.

The complete analytical results for all water quality samples are provided in Appendix B.

4 Benthic Community Analysis

As part of the field effort, a site-specific benthic survey was conducted to verify and refine information on the benthic communities in the Project area. Samples were collected at the proposed location of the FSRU and at 27 stations along the proposed pipeline route (*see* Figure 4-1). Each location was sampled in triplicate, with one sample located on the centerline of the proposed pipeline route, and two additional samples offset by approximately 200 feet from the centerline.

Based on field surveys, soft-sediment communities in the Project area are dominated by several burrowing and tube-dwelling polychaetes, amphipods, tunicates, and anemones. In general, shell hash (*Mercenaria mercenaria*, other clam species, *Crepidula* sp., and *Ensis directis*) varied in abundance within the Project area. Based on video observation, no live individuals of shellfish (hard clams, surf clams, or oysters) were observed, which suggests that a low density of shellfish occur in this area. However, at several locations the video showed evidence of burrows, which are most likely used by lobsters, other invertebrates (e.g., the mud shrimp [*Axius serratus*]), and fish species in the area. The greatest differences in species composition were found when comparing the soft-sediment community (the majority of the proposed Project area) to the community inhabiting rock mounds (sites MG2, MG3, and MG4 across the Stratford Shoal). The results of the benthic sampling are summarized in Table 4-1.

Benthic community biodiversity was assessed using benthic grab data from each of the sampling locations (*see* Figure 4-2). Diversity was calculated for each sampling location using the Shannon-Weaver Diversity Index. While benthic diversity in the mud assemblages was generally greater than expected based on existing literature, the field data show the diversity to be consistent within a given portion of the Project area. Diversity values (H^1) were expected to be lowest along the floors of the western and central basins (ranging from 0 to 1), moderate within the transitional areas around the Stratford Shoal (ranging from 1 to 2), and highest along the Stratford Shoal (ranging from 2 to 3). Values calculated from the samples collected revealed moderate diversity west of the Stratford Shoal (typically from 1 to 2), and values at and east of the Stratford Shoal were generally higher (typically from 2 to 3).

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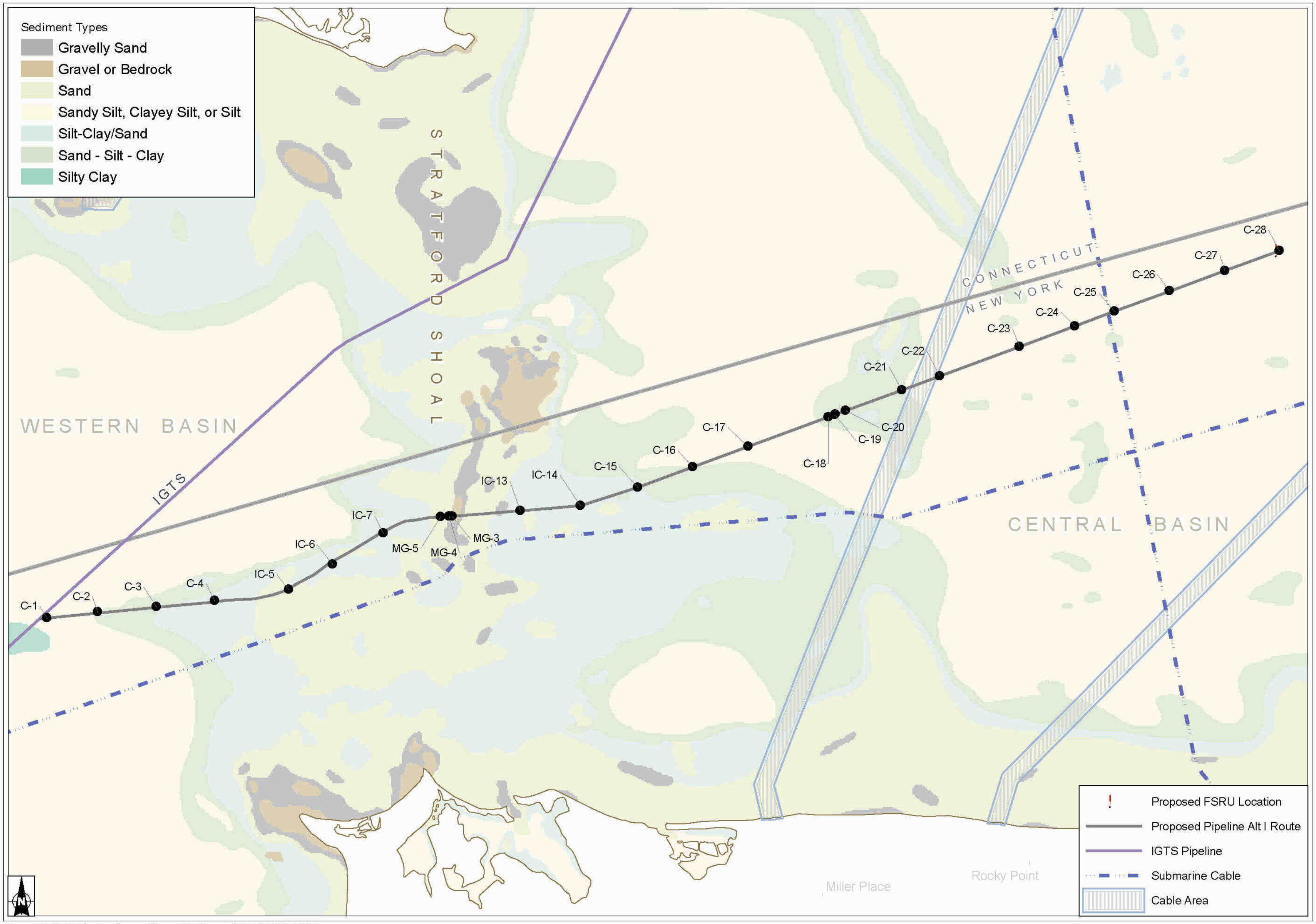

Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000; Broadwater Surveys conducted in April/May 2005.

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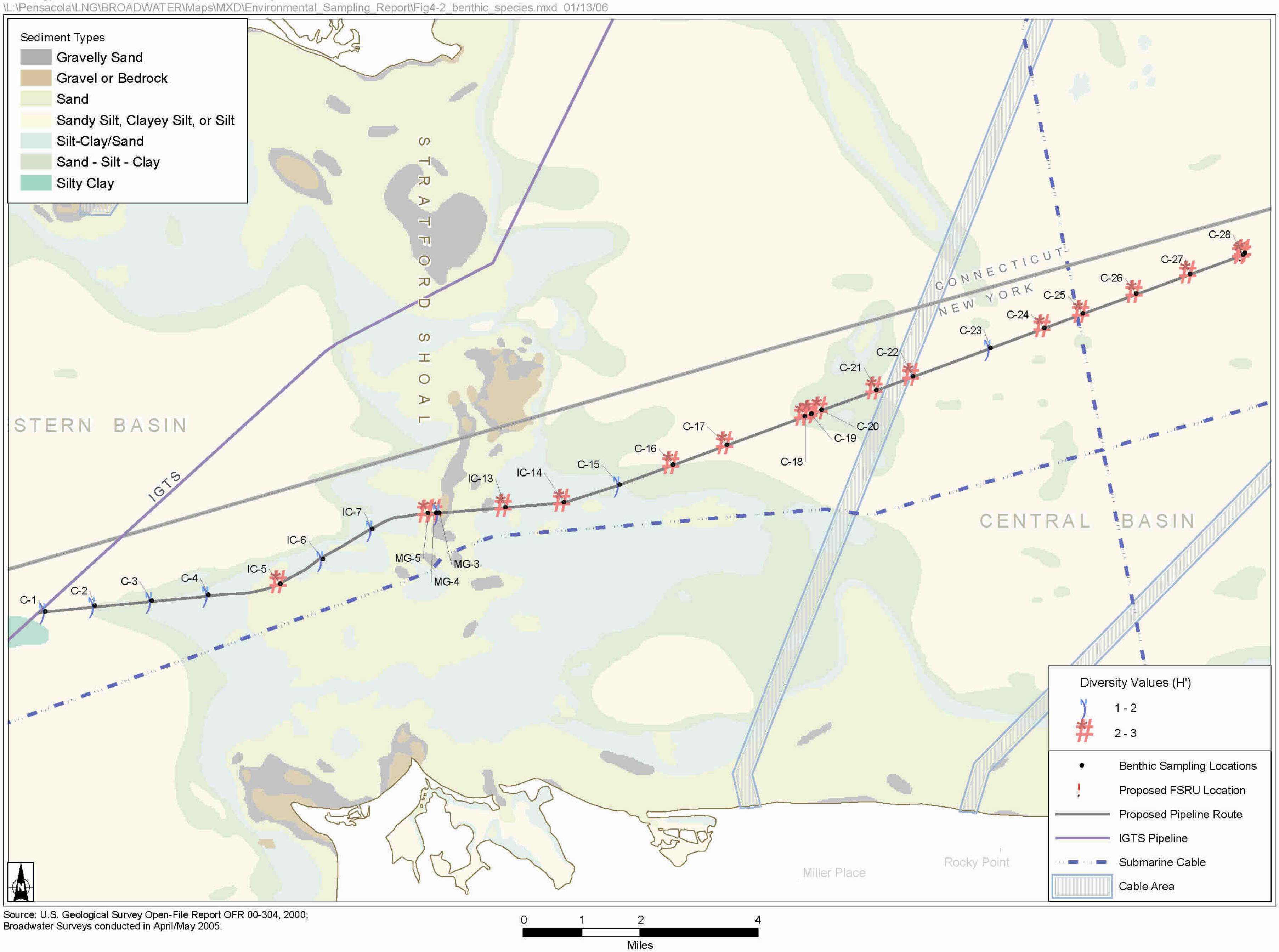
Figure 4-1 Benthic Sampling Stations
Spring 2005 Field Survey

BW000233



Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000;
Broadwater Surveys conducted in April/May 2005.

Figure 4-2 Benthic Community Species Diversity in the Project Area Based on the Spring 2005 Field Survey

Table 4-1 Benthic Data Results Summary for Proposed Pipeline Route, April-May 2005

	Sample ID		
	C1N	C1C	C1S
Total # of Organisms Identified	125	295	205
Total # of Organisms in Sample	125	295	205
Taxa Richness	15	14	19
Diversity (H_1)	2.13	1.26	2.01
Eveness	1.81	1.10	1.57

Notes: dominant species, when totaled = at least 50% sample

Molgula sp. Copepoda *Nephtys* sp.

	C2N	C2C	C2S
Total # of Organisms Identified	108	107	109
Total # of Organisms in Sample	630	510	625
Taxa Richness	11	11	14
Diversity (H_1)	1.11	1.53	1.87
Eveness	1.06	1.47	1.63

Notes: dominant species, when totaled = at least 50% sample

Copepoda Bivalvia (juv.)

	C3N	C3C	C3S
Total # of Organisms Identified	101	111	154
Total # of Organisms in Sample	346	368	856
Taxa Richness	16	12	14
Diversity (H_1)	2.00	1.55	1.68
Eveness	1.66	1.44	1.47

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.) Cirratulidae

	C4N	C4C	C4S
Total # of Organisms Identified	107	114	107
Total # of Organisms in Sample	402	783	1160
Taxa Richness	13	11	13
Diversity (H_1)	1.86	1.57	1.70
Eveness	1.67	1.50	1.52

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.) Copepoda Cirratulidae

	IC5N	IC5C	IC5S
Total # of Organisms Identified	129	126	138
Total # of Organisms in Sample	698	788	347
Taxa Richness	17	17	18
Diversity (H_1)	2.35	2.53	2.12
Eveness	1.91	2.06	1.69

Notes: dominant species, when totaled = at least 50% sample

Molgula sp. Bivalvia (juv.) *Pinnixa* sp. Copepoda

	IC6N	IC6C	IC6S
Total # of Organisms Identified	96	61	115
Total # of Organisms in Sample	330	61	407
Taxa Richness	13	13	13
Diversity (H_1)	1.69	2.02	1.70
Eveness	1.52	1.82	1.52

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.) Copepoda *Nephtys* sp. *Molgula* sp. *Leptocheirus pinguis* Cirratulidae

	IC7N	IC7C	IC7S
Total # of Organisms Identified	62	96	77
Total # of Organisms in Sample	62	96	77
Taxa Richness	13	15	13
Diversity (H_1)	2.04	2.08	1.52
Eveness	1.83	1.77	1.36

Notes: dominant species, when totaled = at least 50% sample

Pinnixa sp. *Nephtys* sp. Cirratulidae Copepoda *Molgula* sp. *Haminoea solitaria*

	MG3N	MG3C	MG3S
Total # of Organisms Identified	112	99	95
Total # of Organisms in Sample	700	438	906
Taxa Richness	13	14	15
Diversity (H_1)	1.89	2.01	1.94
Eveness	1.69	1.75	1.65

Notes: dominant species, when totaled = at least 50% sample

Ampelisca sp. *Ampharete arctica*

	MG4C
Total # of Organisms Identified	103
Total # of Organisms in Sample	774
Taxa Richness	18
Diversity (H_1)	$2.10
Eveness	$1.67

Notes: dominant species, when totaled = at least 50% sample

Ampelisca sp. *Ampharete arctica*

	MG5N	MG5C	MG5S
Total # of Organisms Identified	100	105	92
Total # of Organisms in Sample	480	767	400
Taxa Richness	13	14	14
Diversity (H_1)	2.06	2.04	2.08
Eveness	1.85	1.78	1.81

Notes: dominant species, when totaled = at least 50% sample

Ampharete arctica Ampeliscidae Aoridae *Astarte undata*

Table 4-1 Benthic Data Results Summary for Proposed Pipeline Route, April-May 2005

	IC13N	IC13C	IC13S
Total # of Organisms Identified	113	134	114
Total # of Organisms in Sample	920	1130	751
Taxa Richness	18	17	12
Diversity (H_1)	2.41	2.42	2.06
Eveness	1.92	1.97	1.91

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.)	*Pinnixa* sp.	Aoridae	*Ampelisca sp.*	*Nephtys* sp.	*Asychis elongata*	*Anadara traversa*

	IC14N	IC14C	IC14S
Total # of Organisms Identified	120	144	182
Total # of Organisms in Sample	120	144	182
Taxa Richness	16	20	15
Diversity (H_1)	2.21	2.24	1.58
Eveness	1.83	1.73	1.34

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.)	Copepoda	Aoridae

	C15N	C15C	C15S
Total # of Organisms Identified	98	116	105
Total # of Organisms in Sample	211	500	273
Taxa Richness	18	14	14
Diversity (H_1)	2.25	1.66	1.65
Eveness	1.80	1.45	1.44

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.)	*Tellina* sp.	Copepoda	*Nephtys* sp.

	C16N	C16C	C16S
Total # of Organisms Identified	101	94	95
Total # of Organisms in Sample	240	270	365
Taxa Richness	14	20	15
Diversity (H_1)	2.02	2.39	2.01
Eveness	1.77	1.83	1.71

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.)	Copepoda	*Pinnixa* sp.

	C17N	C17C	C17S
Total # of Organisms Identified	76	77	73
Total # of Organisms in Sample	76	77	73
Taxa Richness	16	15	15
Diversity (H_1)	2.50	2.33	2.28
Eveness	2.08	1.98	1.94

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.)	*Pinnixa* sp.	Sabellidae	*Ateocina canaliculata* [2]	Copepoda	*Tellina* sp.	*Molgula* sp.

	C18N	C18C	C18S
Total # of Organisms Identified	123	112	94
Total # of Organisms in Sample	1386	1220	1400
Taxa Richness	16	18	19
Diversity (H_1)	2.29	2.35	2.50
Eveness	1.90	1.87	1.95

Notes: dominant species, when totaled = at least 50% sample

Pinnixa sp.	*Nephtys* sp.	Copepoda	*Leptocheirus pinguis*	*Ampharete arctica*	*Clymenella* sp.	*Asychis elongata*

	C19N	C19C	C19S
Total # of Organisms Identified	92	106	126
Total # of Organisms in Sample	1034	1220	970
Taxa Richness	19	19	17
Diversity (H_1)	2.41	2.58	2.03
Eveness	1.89	2.02	1.65

Notes: dominant species, when totaled = at least 50% sample

Copepoda	*Ampharete arctica*	*Crepidula fornicata*	*Nephtys* sp.

	C20N	C20C	C20S
Total # of Organisms Identified	91	113	150
Total # of Organisms in Sample	483	113	150
Taxa Richness	17	17	18
Diversity (H_1)	2.41	2.28	2.50
Eveness	1.96	1.85	1.99

Notes: dominant species, when totaled = at least 50% sample

Nephtys sp.	*Ampharete arctica*	*Crepidula plana*	*Asychis elongata*	*Ampelisca* sp.	Aoridae

	C21	C21C	C21S
	108	128	118
Total # of Organisms in Sample	690	1120	674
Taxa Richness	15	16	18
Diversity (H_1)	2.26	2.42	2.42
Eveness	1.92	2.01	1.92

Notes: dominant species, when totaled = at least 50% sample

Pinnixa sp.	*Ampelisca* sp.	*Nephtys* sp.	*Ampharete arctica*	Copepoda

	C22N	C22C	C22S
Total # of Organisms Identified	60	62	50
Total # of Organisms in Sample	60	62	50
Taxa Richness	14	13	13
Diversity (H_1)	2.27	2.08	2.25
Eveness	1.98	1.87	2.02

Notes: dominant species, when totaled = at least 50% sample

Nephtys sp.	*Molgula* sp.	Copepoda	Aoridae	*Asychis elongata*

Table 4-1 Benthic Data Results Summary for Proposed Pipeline Route, April-May 2005

	C23N	C23C	C23S
Total # of Organisms Identified	124	112	157
Total # of Organisms in Sample	481	112	157
Taxa Richness	10	16	20
Diversity (H_1)	1.28	1.81	2.55
Eveness	1.28	1.50	1.96

Notes: dominant species, when totaled = at least 50% sample

Bivalvia (juv.) Copepoda Pyramellidae *Nephtys* sp. *Asychis elongata* Sabellidae *Molgula* sp.

	C24N	C24C	C24S
Total # of Organisms Identified	102	96	113
Total # of Organisms in Sample	102	96	113
Taxa Richness	16	17	21
Diversity (H_1)	2.27	2.33	2.61
Eveness	1.88	1.89	1.98

Notes: dominant species, when totaled = at least 50% sample

Nephtys sp. *Pinnixa* sp. Copepoda *Molgula* sp. Bivalvia (juv.) *Ampelisca* sp.

	C25N	C25C	C25S
Total # of Organisms Identified	100	132	109
Total # of Organisms in Sample	100	132	109
Taxa Richness	21	21	16
Diversity (H_1)	2.60	2.61	2.24
Eveness	1.97	1.98	1.86

Notes: dominant species, when totaled = at least 50% sample

Molgula sp. Bivalvia (juv.) *Nephtys* sp. *Asychis elongata* Sabellidae *Ampelisca* sp. *Pinnixa* sp. Copepoda

	C26N	C26C	C26S
Total # of Organisms Identified	195	18	99
Total # of Organisms in Sample	195	18	99
Taxa Richness	15	7	18
Diversity (H_1)	2.14	1.74	2.55
Eveness	1.82	2.06	2.04

Notes: dominant species, when totaled = at least 50% sample

Cirratulidae *Nephtys* sp. *Ampelisca* sp. *Pinnixa* sp. Copepoda Bivalvia (juv.) *Molgula* sp.

	C27N	C27C	C27S
Total # of Organisms Identified	156	138	123
Total # of Organisms in Sample	156	138	123
Taxa Richness	15	19	16
Diversity (H_1)	2.14	2.29	2.05
Eveness	1.82	1.79	1.70

Notes: dominant species, when totaled = at least 50% sample

Cirratulidae *Nephtys* sp. Copepoda

	C28N	C28C	C28S
Total # of Organisms Identified	118	122	197
Total # of Organisms in Sample	118	122	197
Taxa Richness	13	17	13
Diversity (H_1)	1.87	2.44	1.97
Eveness	1.67	1.98	1.77

Notes: dominant species, when totaled = at least 50% sample

Molgula sp. Copepoda Cirratulidae *Nephtys* sp. *Ampelisca* sp. Bivalvia (juv.)

The data indicate that benthic communities are generally consistent with expected levels based on depth, substrate, and sedimentary environment in the Project area. Four general benthic communities were identified in the Project area (*see* Figure 4-3): a Deep Basin Mud Community, a Western Transition Community, a Shoal Community, and an Eastern Transition Community.

Deep Basin Mud Community
(Stations C-1, C-2, C-3, C-4, C-19, C-21, C -22, C-23, C-24, C-26, C-27, and C-28)

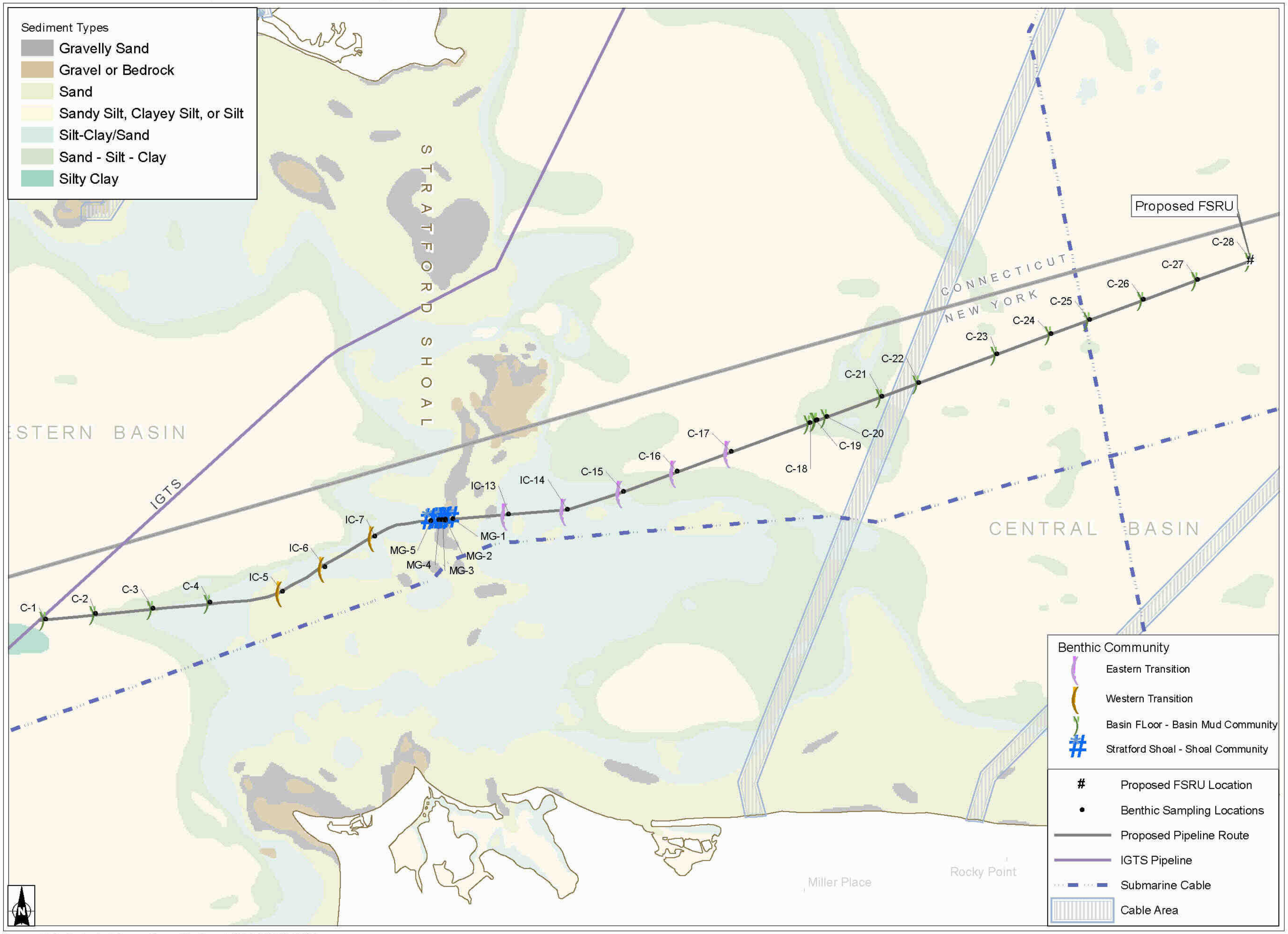
A Deep Basin Mud Community was found at stations located at the eastern and western edges of the proposed Project area, along the floor of the western and central basins. Bottom substrates in these areas are comprised of fine silt and sand and a patchy distribution of clay. Based on video observations, these 12 stations were similar with regard to abundance of burrowing anemones and worm tubes and the occasional presence of the tunicate *Molgula* sp. The mud tubes are comprised of mud and mucous. Shrimp, amphipods, and a few solitary hydroids were present at these stations. Burrows also were observed, and these are most likely used by lobsters, other invertebrates (e.g., mud shrimp [*Axius serratus*]), and fish species in the area. Shell debris is sparse at these stations. The benthic samples collected at these sites were dominated by polychaetes, amphipods, and juvenile bivalves. These organisms are typically found in soft sediments.

Western Transition Community
(Stations IC-5, IC-6, and C-7)

The Western Transition Community is located in the western portion of the Project area, along the transition from the western basin floor to the Stratford Shoal. The bottom sediment observed in the underwater video is composed of fine-grain silt, which is similar to the existing sediment mapping classifications. Worm tubes and anemones are present. One of the dominant organisms collected in the benthic samples was the pea crab (*Pinnixia* sp). Pea crabs are typically found living on mud bottoms and in worm tubes of the polychaete worms *Arenicola* and *Chaetopterus variopedatus*, which also were present in the benthic samples. These polychaete species are found offshore in soft sediments. The solitary tunicate *Molgula* sp. and the polychaete worm *Nephtys* sp. also were dominant species in the benthic samples. Both of these species are found in a mixture of fine-grain sand and silt.

Shoal Community
(Stations MG -1, MG-2, and MG-3)

The Shoal Community is located at the Stratford Shoal. Based on sediment samples collected using a vibracore, the bottom sediments in this area are classified as gravely sand and bedrock. The benthic community found in the sediment at these sites is diverse and complex. Bivalves are present. The shell hash is comprised of *Mercenaria mercenaria*, other clam species, *Crepidula* sp., and *Ensis directis*. The bottom sediment is covered by colonies of hydroids and amphipod mats.



Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000;
Broadwater Surveys conducted in April/May 2005.

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Figure 4-3 Benthic Communities in the Project Area Based on the Spring 2005 Field Survey

A spider crab and whelk were noted based on video review. Motile organisms observed at these stations include shrimp and amphipods. The two dominant organisms identified in benthic samples collected at these sites were the amphipod *Ampelisca* sp. and the polychaete *Ampharete artica*. *Ampelisca* sp. is found on sandy and muddy bottoms. They build parchlike tubes and form mats. One common species is *A. abdita*. They construct tubes of fine sand grains approximately 3.5 centimeters in length and 2 to 3 millimeters wide. Most of the tube is below the substrate, with approximately 1 centimeter protruding above the surface. These dominant organisms support the video observations.

Eastern Transition Community
(Stations C-13, C-14, C-15, C-16, and C-17)
The Eastern Transition Community is located in the middle of the proposed Project area, along the transition from the Stratford Shoal to the central basin floor. Bottom sediments in these areas are comprised of silt and sand. Polychaete worms, tubes, burrowing anemones, and tunicates are present in the greatest numbers. Colonial hydroids are present on shell debris, and solitary hydroids are scattered throughout each area. The dominant organisms found in the sediment in this transition community varied between polychaetes, amphipods, and bivalves. These organisms are found in deep and shallow water and are typical of sand and silt sediment types.

McCall (1977, 1978) conducted studies in Long Island Sound between 1972 and 1973 that were designed to address how infaunal communities responded to disturbance, as well as subsequent successional dynamics leading to the reestablishment of the benthic community. McCall (1977) determined that there were three successional groups of species: Group I, those that initially colonized disturbed areas in very high numbers; Group II, those that are typical of intermediary succession following disturbance; and Group III, those that represent the successional endpoint community. Based on McCall's work, the communities identified by Broadwater's field efforts resemble a gradation between secondary and tertiary successional stages. These stages exhibit species that are similar to those noted by McCall as Groups II and III, which typically attain peak abundance during middle to late succession and include bivalves and polycheates. These species represent larger, mobile, and deeper-living organisms (especially Group III). In contrast, the first stage successional community (Group I) typically consists of early colonizers that are very high in number and opportunistic in nature. They are generally small, live in tubes within the upper layers of the sediment, and have rapid colonization life history strategies.

5 Drop Camera Video

A video of the bottom was obtained for 23 of the sampling locations indicated on Figure 2-1 and analyzed to supplement the benthic sampling data. To collect videos of the bottom, a drop camera was lowered to the depth specified for the specific sample location by the fathometer on the survey vessel. The drop camera was allowed to stabilize in the water column until it remained steady enough to obtain a good image. An onboard monitor was used to ensure that the camera was steady and to make initial observations of the benthic community. Once the image was steady, a slow trawl across the bottom captured the bottom video for that location. A CD containing a copy of the video is provided in Appendix E.

Underwater video observations are best used to supplement existing benthic data. Due to the camera movement, shadows, camera magnification, and video quality, it is often difficult to confirm species identification and to determine abundances using only video observations. Specific observations resulting from the analysis of the videos has been incorporated into the discussions in Section 5.

6 Acoustic Doppler Current Profiles

To verify existing tidal currents within the Project area, three ADCPs were deployed during the course of the field sampling effort. One ADCP was deployed near the proposed tie-in with the IGTS system (C-1), one was deployed near the proposed FSRU location (C-28), and a third was deployed at the proposed crossing of the Stratford Shoal (MG-3). The ADCPs were deployed for one entire tidal cycle in May 2005. The data obtained from the ADCPs confirmed the tidal current ranges described previously. Tidal currents at the IGTS tie-in location, which is located in the western third of the Sound, averaged 0.64 feet per second (ft/s) (0.2 m/s). Tidal currents at the proposed FSRU location averaged 0.84 ft/s (0.3 m/s). The existing physiographic conditions present at the Stratford Shoal resulted in an average current of 1.34 ft/s (0.4 m/s). Detailed data output from the ADCPs is provided in Appendix F.

7 Quality Assurance/Quality Control and Data Validation

Sediment and surface water samples collected during the field effort were submitted to Severn Trent Laboratories (STL) Buffalo for general environmental analysis, STL Knoxville for dioxin analysis, STL Burlington for total organic carbon and salinity analyses, and Ambient Group, Inc., for fecal coliform and total coliform testing. All laboratories were approved as required by the guidance prescribed in TOGS 5.1.9 for In-Water and Riparian Management of Sediment and Dredged Material (November 2004). Validation reports for all sampling data are provided in Appendix G.

Analytical data reports generated by the laboratories were checked to verify that the reported data are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods in the NYSDEC ASP (June 2000). The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples (same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

The DVM contains a detailed listing of the concerns addressed during analytical data review and a listing of sample qualifiers. In general, none of the data were rejected, and all of the data qualified are usable for the Project. The sample results were low, and laboratory reporting limits were well below any of the screening criteria used for data evaluation. The primary areas of data qualification can be summarized as follows:

- • Holding times for several non-critical parameters were slightly exceeded due to scheduling errors at the laboratory. The affected data are flagged as estimated.
- • Low levels of volatiles, pesticides, and dioxin/furans were detected in method blanks, and low levels of carbon disulfide were detected in the rinsate sample. The associated sample results are considered associated with laboratory or field background. The affected data are flagged "U" as non-detect and are reported as non-detect at the reporting limit. If the result is above the reporting limit, the reporting limit is considered elevated.
- • All metals results outside spike control limits were flagged "N" by the laboratory, and metals results outside control limits were flagged "E" by the laboratory. The flags were converted to "J" flags to indicate an estimated value.
- • The results for chemical oxygen demand (COD) are much higher than the results for BOD. It is clear that the high levels of chloride interfered with the analysis. The results are flagged "J" as estimated and not indicative of actual COD levels.
- • Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified "J" as estimated. The samples collected in duplicate generally show good precision for all parameters, and the results that were qualified were not for compounds of concern.
- • The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds. TIC values were reported as "NJ" with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. In general, the results are related to laboratory background except for trace levels of hydrocarbon-related compounds in several samples, including C-22, C-25, C-3D, C-9, IC-5, and IC-6. These levels are not a concern for this Project.

A Sampling and Analysis Plan

Revised
Broadwater
Sampling and Analysis Plan
Long Island Sound
2005

April 2005

Prepared for:

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List of Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
DQO	data quality objective
DOS	Department of State
E & E	Ecology and Environment, Inc.
EDD	electronic data deliverable
FSRU	floating storage regasification unit
HASP	health and safety plan
LNG	liquefied natural gas
mcl	maximum contaminant level
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PQL	practical quantitation limit
QA/QC	quality assurance/quality control
SOP	standard operating procedure
TOC	total organic carbon
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1 Introduction

Broadwater Energy (Broadwater), a joint venture of TransCanada Pipeline Ltd. USA and Shell US Gas and Power, is proposing a project to increase the supply of natural gas to the New York market to provide the region's consumers with a much needed, clean and reliable and secure energy source. Broadwater is proposing to construct a Floating Storage and Regasification Unit (FSRU) for the storage and vaporization of liquefied natural gas (LNG). The proposed LNG facility is located approximately nine miles off the coast of Riverhead, New York (about 11 miles from the nearest Connecticut shoreline) in the Long Island Sound. The terminal would connect with the existing subsea Iroquois Gas Transmission system pipeline via an underwater connecting pipeline that would be approximately 25 miles long as shown in Figure 1-1, which displays the project survey area.

Ecology & Environment, inc. (E & E) has been contracted to support the Broadwater project effort in all aspects of environmental evaluation related to the preparation of an application to the Federal Energy Regulatory Commission (FERC) as well as the preparation of all relevant State of New York permits. In order for the application, permit and ultimately the installation processes to move forward, an evaluation of the physical, chemical and biological characteristics of the pipeline route must be undertaken. This sampling and analysis plan supports this evaluation.

This sampling and analysis plan was prepared in accordance with New York State Department of Environmental Conservation, Division of Water (DOW), Technical and Operational Guidance Series (TOGS) 5.1.9 for In-Water and Riparian Management of Sediment and Dredged Material, November 2004. The sampling and analysis plan presents a comprehensive program to investigate and characterize the pipeline route and will provide valuable data necessary to finalize route selection and methods of installation. The data collected through this effort may result in modifications to route selection. In those areas where it is feasible; the route may be moved or changed due to associated impacts from potential sediment contamination, the quality of benthic communities, and or the physical nature of the sediments and their suitability for pipeline construction.

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Source: ESRI StreetMap, 2002.

Figure 1-1
Proposed Broadwater Project
Location in Long Island Sound

2 Project Location and Description

Broadwater's FSRU is located in Long Island Sound, nine miles off the coast of Long Island, near Riverhead, NY. The project survey area including latitude and longitude is detailed in Figure 1-1.

This location is in the open water marine environment of Long Island Sound that is utilized by recreational boaters and has commercial use as a lobster and finfishery. These characteristics are not unique to the project location in that much of Long Island Sound is used for recreation in the warmer months and commercial fishing is a common practice throughout Long Island Sound. The project location is characterized by open water that is approximately 28 meters (approximately 93 feet) deep. Sediment conditions in the project area vary from a sandy silt and clay mix to a purely sandy bottom. In the western end of the project area along the pipeline route, a linear outcrop or shoal feature extends in a north-south direction across the Sound that is defined as erosional or non-depositional containing gravelly sand and bedrock.

In this environment, the actual LNG facility would consist of a ship-like FSRU vessel moored in Long Island Sound. The FSRU would be approximately 1,200 feet long and 180 feet wide. It would rise approximately 75 to 100 feet above the water. As determined by Broadwater, the LNG facility would be a floating storage and regasification unit (FSRU) utilizing a soft yoke mooring system (YMS), allowing the FSRU to weathervane with wind patterns. The actual sub sea disturbance from the YMS will be limited to an area approximately 7,000 square feet. The FSRU is being designed to accommodate storage of approximately 350,000 cubic meters of LNG, with vaporization and distribution of approximately 1 Bcf/day to the Iroquois system accomplished using submerged combustion vaporization (SCV) technology.

Every two to three days the FSRU would receive LNG shipments from ocean-going carriers that would enter the Sound and offload their cargo as many ships do today in the region. Once offloaded, the LNG would be stored in tanks in the hull of the FSRU. The LNG would be warmed back into a gas (regasified) before it is sent into the New York and Connecticut markets through the existing Iroquois pipeline through a connecting pipeline that would be approximately 25 miles long (depending on the final pipeline route). The concrete-coated, 30-inch-diameter pipeline would be installed beneath the seabed using a trenching operation optimized for the location and type of seafloor soils encountered along the route and characterized through this sampling effort. Depending on the trenching method used, the pipe would either be laid directly into a trench or placed on the seabed and then lowered beneath it. After the pipe is lowered, the trench would either be backfilled mechanically with the original sediments displaced during trenching or allowed to backfill through natural sedimentation processes.

3 Objectives

The objective of this sampling survey and analysis effort is to physically, chemically, and biologically characterize the pipeline route, as determined by an engineering reconnaissance survey. The intent of the reconnaissance survey is to verify the data developed during a desktop analysis of physical and biological conditions in the vicinity of the proposed pipeline route and make modifications to that pipeline route based on the actual infield conditions. Because the reconnaissance level survey will be completed immediately prior to the detailed surveying effort, the final location and number of samples to be collected will therefore be finalized just prior to the detailed survey phase. However, this sampling and analysis plan provides an accurate representation of the actual surveys that will be implemented. The scope of the reconnaissance survey is limited to collecting physical data to determine constructability of the pipeline. No sediment, water or biological sampling will be conducted during the reconnaissance survey.

This sampling plan has been organized into 4 major sections. Each section outlines investigations that will take place along the pipeline route to address potential resources or physical sediment issues including geotechnical investigations, sediment chemical analysis, water quality analysis, and benthic community analysis. A media summary and description of samples that will be collected in each matrix is presented in Section 4.0 and Table 4-1.

3.1 Background

Several investigations have been performed in Long Island Sound to characterize not only any contamination present, but to qualify use of the area for purposes such as commercial fishing and recreation. An extensive effort has been undertaken by Broadwater to gather and evaluate this information, as part of the preliminary site selection process. These evaluations were performed to ensure that all factors affecting the location chosen for the facility were taken into account. Both engineering and environmental criteria were used to discriminate between FSRSU sites and pipeline routes with the objective of arriving at a supportable conclusion regarding the final siting location for project facilities. Data from previous investigations and several publicly available published data sets were utilized taking many factors into consideration including NOAA navigational charts, commercial fisheries and marine resources, sedimentary environment, benthic communities, historical sediment contamination, water quality, cultural resources, wind and wave data, marine hazards and obstructions, existing cables and pipelines, land use and socioeconomics of the region, climate and oceanography, and vessel traffic. The analyses of this data lead to the current project location in Long Island Sound.

3.2 Physical Sedimentary Environment

Data on the sediment types present along the proposed pipeline route was compiled from the U.S. Geological Survey Open File Report OFR 00-304, 2000 and mapped to display all sediment types in the area and specific locations where the sediment type changes. The sediment interfaces indicate locations where a sediment sample should be taken since different sediment types have different transport properties and also interact differently with contaminants. Therefore, characterization of contaminants at these locations is important for pipeline installation.

This interaction between contaminants in the sedimentary environment is dependent on sediment properties such as a high clay or silt content versus a more gravel or cobble like texture. As discussed in Section 3.3 below, contaminant levels tend to be higher in sediments with a high clay or silt content since contaminants adhere to clay particles more readily and become sequestered as part of the particle complex since the surficial charge on clay particles attract contaminants. However, cobble or gravel materials do not contain a positively charged surface and contaminants don't adhere as readily to this type of sediment.

Based on the sediment types found along the proposed pipeline route and knowing the behavior of contaminants in these environments, Figure 3-1 was developed which displays the currently proposed sample interval. This interval approximates 1 sample per mile, with adjustments made along the pipeline route to account for sediment changes. The final interval has been expanded at some locations and tightened at other locations to ensure that areas where the sediment type changes are sampled and characterized during the sediment core investigation. As discussed previously, the final placement of the sampling locations will be completed following the reconnaissance surveys, after which a specific pipeline route will be defined.

3.3 Contaminants of Potential Concern

Based on the historic uses and sediment characteristics of Long Island Sound, contaminated sediment is found in many areas of the sound where increased point and non-point source pollution has occurred. Several sediment studies have been undertaken to characterize this contamination that have lead to the general conclusion that the increased levels of contamination are present in the western portion of the sound that contains the most industrial development and the highest population inputs. Contaminant levels are reduced toward the eastern portion of the Sound.

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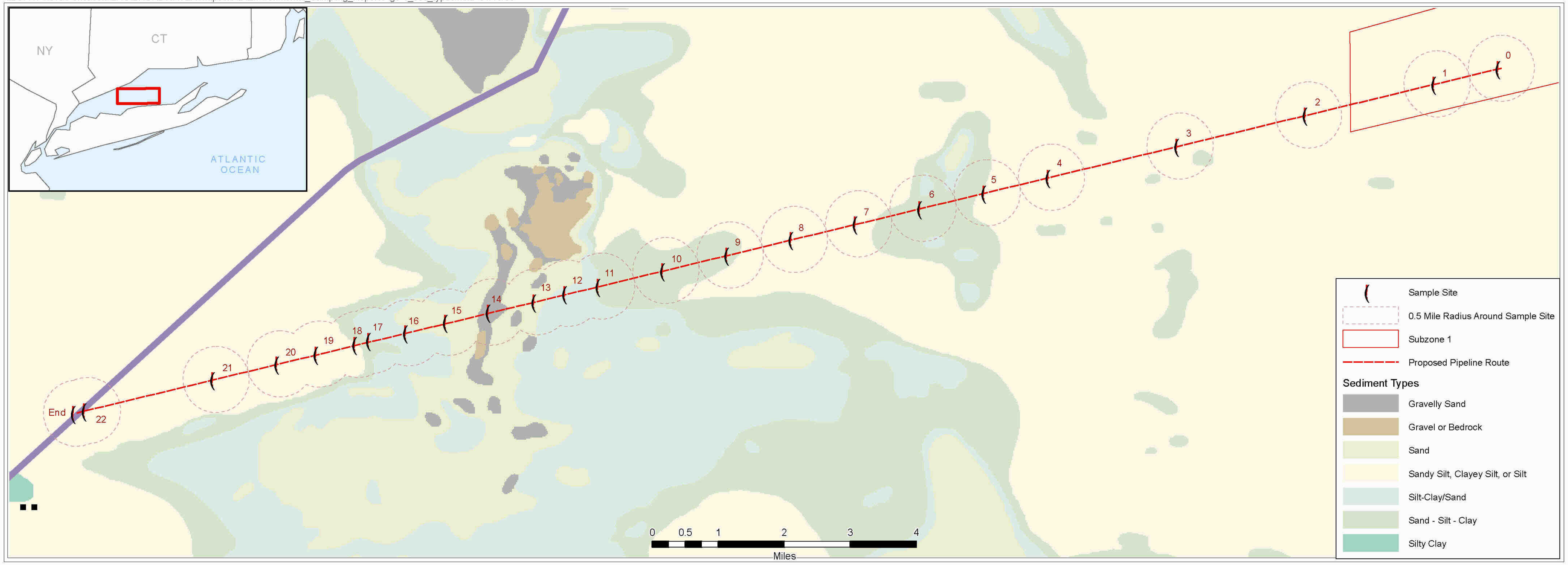

Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-1
Sediments and Sample Locations

The proposed pipeline route lies in the open water environment of central Long Island Sound. While not as contaminated as the western portions of the Sound, this area is not free of contamination. As depicted in Figures 3-2 through 3-5, historic contamination from selected metals (chromium, lead, mercury, and zinc) is present in areas surrounding the proposed pipeline route, but the current route placement was chosen to avoid those areas containing the highest levels of contamination as shown in red on Figures 3-2 through 3-5. Data from the New York State Sediment database that was provided by NYSDEC was also reviewed and compared to the datasets presented in Figures 3-2 through 3-5. It was determined that the levels of contamination were of the same magnitude for both datasets and the level of contamination was similar at the same locations. The data points reviewed from the New York State Sediment database are shown on Figure 3-6.

In addition to metals contamination, other contaminants are found in Long Island Sound sediments including polycyclic aromatic hydrocarbons (PAHs) and petroleum related compounds, select pesticides, polychlorinated biphenyls (PCBs) and dioxins. These contaminants are included as part of the analyses that will be performed on every sediment sample that is collected as part of this investigation. The specific contaminant list required by NYSDOW TOGs is provided in Section 5.2. The analyses will ensure characterization of the pipeline route as required by the NYSDOW TOGs and identify any areas of contamination that may be problematic during pipeline installation including secondary impacts from sedimentation or water quality contamination.

3.4 Benthic Data

Data collected which depicts the quality of benthic habitat present in Long Island Sound includes several studies conducted to determine bottom type characteristics as well as supporting data regarding benthic species and diversity in the project area.

Data published by the U.S. Geological Survey and the University of New Haven, in coordination with the Woods Hole Field Center, quantified the presence of the 35 most common species found in Long Island Sound benthic communities. The areas with the highest numbers of species were in the near shore areas of Long Island Sound while open water areas contained less species and a lower diversity of species. This data was taken into consideration in determining the proposed pipeline route and also supports the idea that a pipeline in the deep open water environment is less likely to impact sensitive benthic communities.

The benthic sampling effort presented in this sampling plan will ensure a full characterization of all communities along the proposed pipeline route and in surrounding areas that maybe potentially impacted during pipeline installation from physical disturbance, sedimentation, or water quality impacts.

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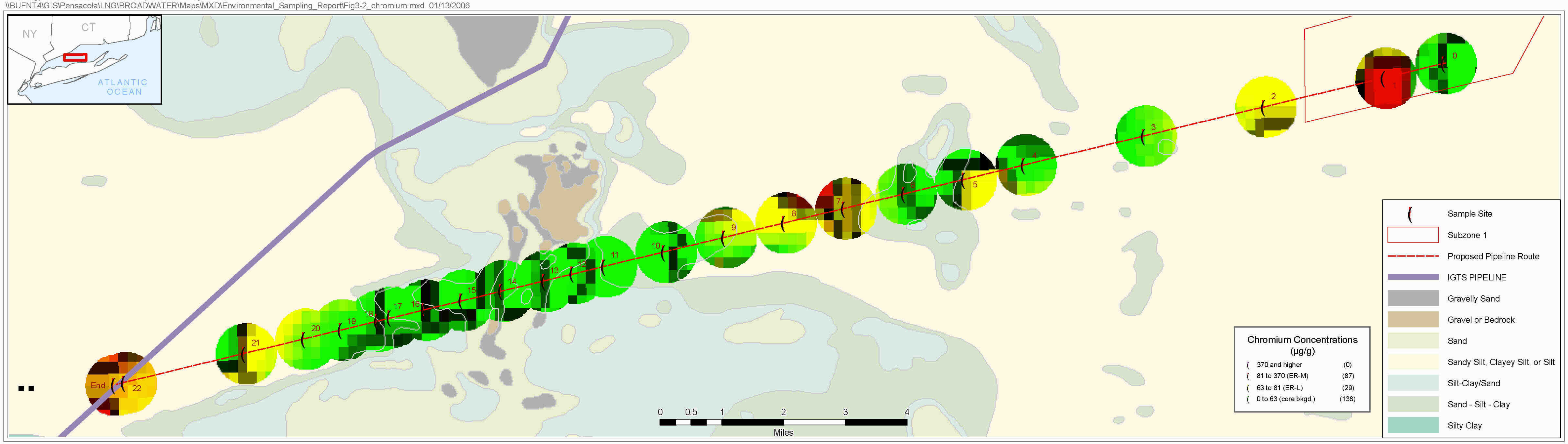
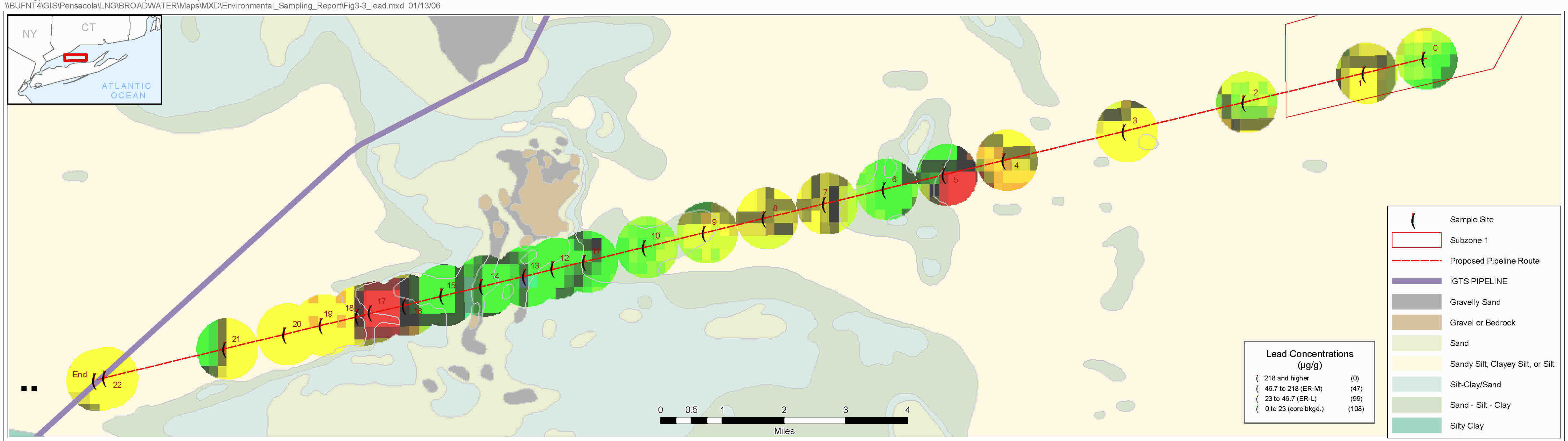


Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-2
Chromium Concentrations and Sediment Types
Proposed Pipeline Route



Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-3
Lead Concentrations and Sediment Types
Proposed Pipeline Route

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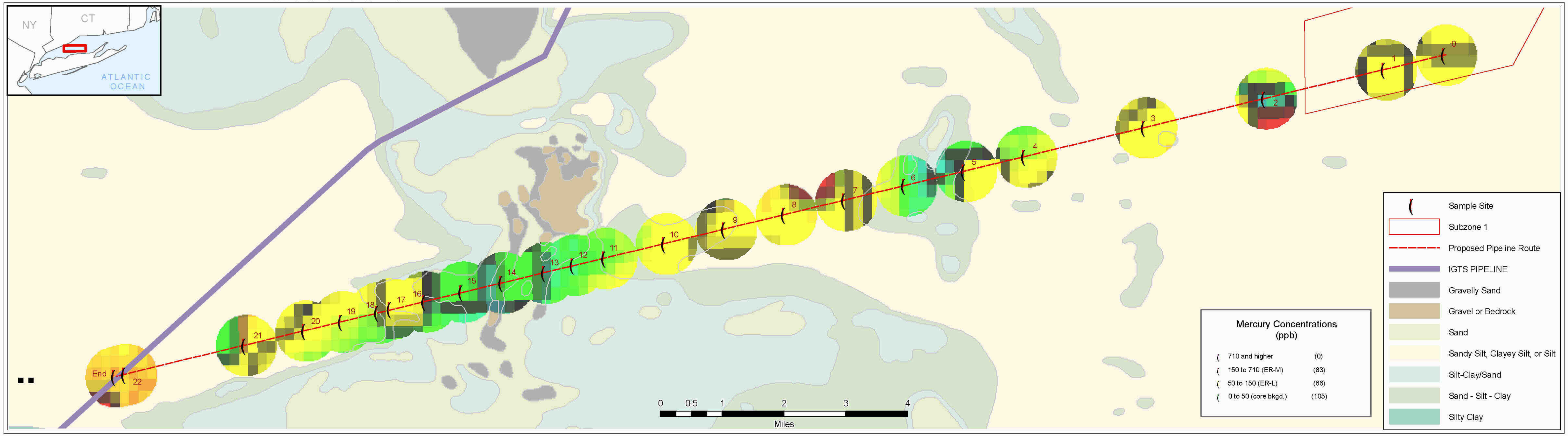

Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-4
Mercury Concentrations and Sediment Types
Proposed Pipeline Route

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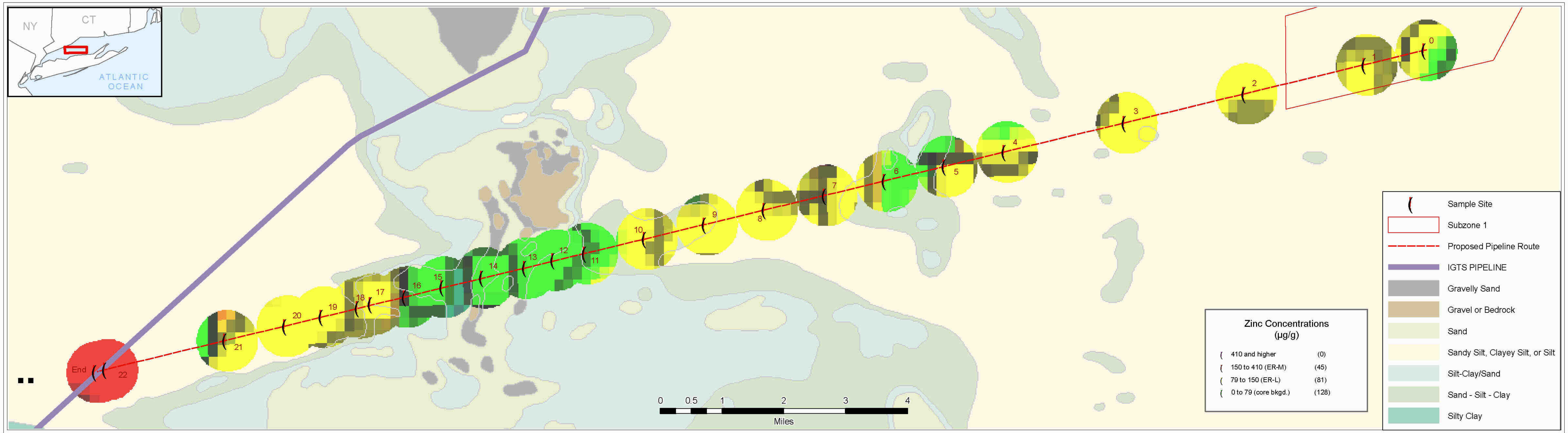

Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-5
Zinc Concentrations and Sediment Types
Proposed Pipeline Route

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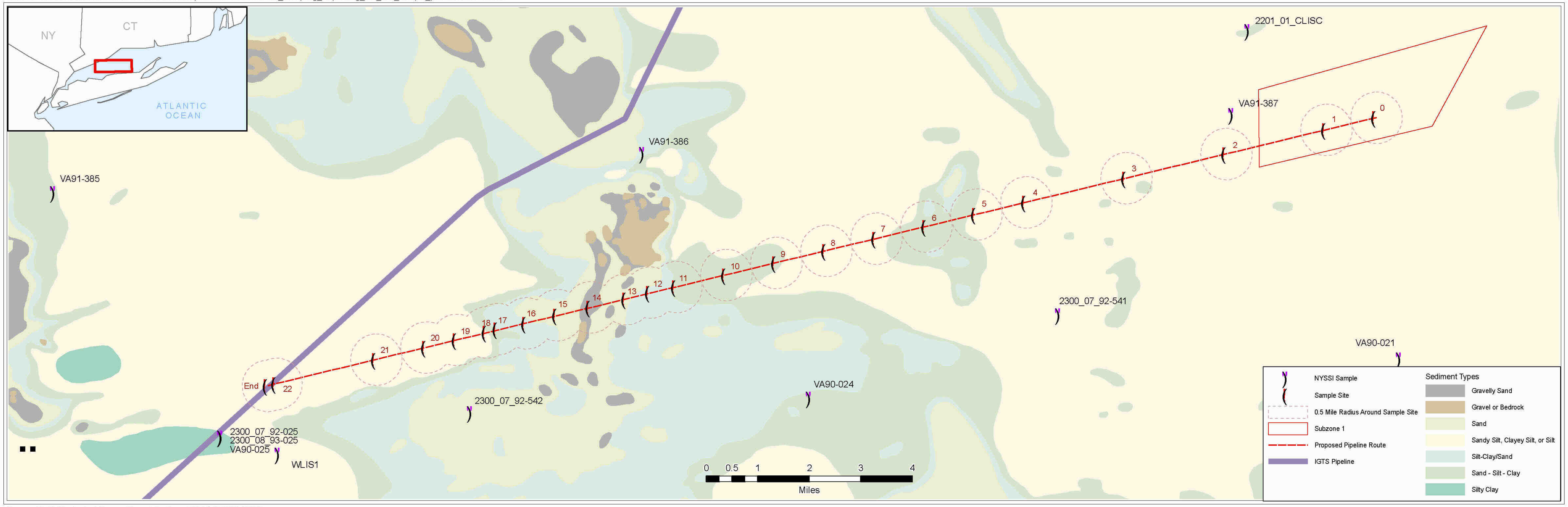

Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000

Figure 3-6
New York State Sediment Sample Locations
Proposed Pipeline Route

3.5 Additional Anticipated Data Collection

This sampling plan has been developed to specifically address data needs for the Spring 2005 sampling season in support of the FERC application.
Broadwater anticipates the potential need for additional survey requirements (benthic, video, and fishery assessment) either later in the application process, or as part of long term monitoring requirements conditioned into permit approvals.

3.5.1 Benthic Sampling

Based on the results of the Spring 2005 field sampling, Broadwater will consult with the resource agencies to address the need for supplemental benthic collection and analysis corresponding with the anticipated construction season. At present time, the construction window has not yet been defined and therefore, it is premature to schedule additional benthic collection.

3.5.2 Video Imaging of the Bottom

Broadwater anticipates collecting some level of video imaging of the Sound bottom in conjunction with permitting process. This has been requested by the resource agencies to verify the remote data collection effort and to provide a record of the bottom conditions. Broadwater is currently evaluating various alternatives to collecting photo documentation, which will be submitted to the resource agencies outside of the scope of this sampling effort.

3.5.3 Fisheries Assessment

The establishment of an exclusion zone in conjunction with the operation of the FSRU is estimated to exclude approximately 1 square mile of Long Island Sound from access to commercial and recreational fisherman. Broadwater anticipates that a long term monitoring program may need to be established to assess the actual impacts to fishery stocks, resulting from the elimination of fishing pressures. The wealth of existing information on the Sound fisheries is considered adequate for the current NEPA analysis. However, the long-term impacts from the establishment of the exclusion zone may need to be evaluated to provide an actual accounting of the impacts, both positive and negative, from which the resource agencies may be able to make long-term management decisions. Since a one time fish sampling effort would carry no statistical validity toward any decision making process, Broadwater may propose to implement a longer term monitoring program to assess the actual impacts to the existing ecosystem in proximity to the FSRU.

The first task will be establishing a baseline of conditions upon which changes can be assessed. Because the FSRU would not be installed and operational until 2010, Broadwater proposes to initiate baseline monitoring in the year prior to project implementation. The extent of the surveys would be developed in consultation with the state resource agencies during the course of project permitting. Broadwater anticipates that the surveys may be conducted over a minimum of a five-year period to allow for maturation of a community following the installation of the mooring tower and FSRU.

3.5.4 Geotechnical Analysis for the Mooring Tower

Broadwater anticipates a more detailed analysis of the geotechnical conditions in vicinity of the FSRU to be completed in 2006. These surveys will consist of large diameter bores to the anticipated depth of the mooring tower, approximately 80 to 100 feet in depth or to bedrock, which ever is shallower.

4 Technical Approach

The interval established for this sampling effort has taken into account site-specific conditions including sediment type and potential sediment contamination. This interval approximates 1 sample per mile, with adjustments made along the pipeline route to account for sediment changes (see Figures 3-1 through 3-5). The final interval has been expanded at some locations and tightened at other locations to ensure that areas where the sediment type changes are sampled and characterized during the sediment core investigation. As discussed previously, the final placement of the sampling locations will be completed following the reconnaissance surveys, after which a specific pipeline route will be defined. The sample locations will be modified to adjust for geophysical characteristics that indicate major variations in the bottom along the final route. The sample locations for the geotechnical, sediment chemistry, benthic and water quality will be collocated along the final pipeline route based on these variations.

4.1 Geotechnical Investigation

The purpose of the geotechnical sampling program is to ground-truth the geophysical survey results as well as provide samples for geotechnical analysis. The data from these geotechnical analyses is important in the overall siting and design of the pipeline.

Sediment core samples will be collected approximately 1 every mile along the proposed pipeline route, with modifications to the intervals required to assure collection of samples in relevant locations and adequate characterization of the sediments to be traversed. Samples will be collected on the centerline of the route(s). Based upon the proposed spacing and an estimated pipeline route of 22 miles, approximately 22 samples will be collected. It is estimated that an additional 4-5 samples will be collected for ground-truthing locations, to be identified after the geophysical survey results have been reviewed. A total of 26-27 locations will be sampled. The number of samples does not include those collected for QA/QC analyses, which is discussed in Section 5.0.

At each location, the depth of the core will be at least 10 feet below the seafloor or to core refusal. Samples will be collected at three-foot intervals or at stratigraphic changes, with the first sample taken 1 foot below the seafloor. The final number of samples that will be submitted for analysis will be determined based on the results of the reconnaissance survey conducted in the beginning of March 2005.

In addition to the sediment cores analysis for geotechnical data, an additional field test will be performed using a cone penetrometer unit. This unit will be deployed from the sampling vessel at each location where a vibracore is collected. Detail about the sample method and data collected by this device is included in Section 5.0.

4.2 Sediment Chemical Investigation

The purpose of the sediment chemical investigation is to verify that sediment that will be disturbed during the construction is not contaminated with chemicals of concern above threshold levels. If areas are contaminated with chemicals of concern, the sediment chemistry will help establish best management practices for dredging during the construction.

Sediment core samples retrieved for chemical analysis will be collected at a frequency of approximately 1 per mile, with modifications taken into account to address both differing sediment types and known areas with a higher contamination potential. Samples will be collected along the centerline of the route(s) coincident with the geotechnical samples and composited over the installation depth. Due to the analysis requirements for the geotechnical samples, it will not be possible to take splits from the geotechnical sample for chemistry analysis. Rather a second, separate, vibracore sample will be required at each station. Based upon the proposed spacing along an estimated pipeline route of 22 miles, a total of approximately 22 cores will be collected with additional 4-5 sediment cores collected from the location of the FSRU. These cores will be subdivided and additional samples may be generated for analysis. The number of samples does not include those collected for QA/QC analyses, which is discussed in Section 5.0.

4.3 Water Quality Analysis

The purpose of the water quality analysis is to establish background in the water column and compare data to water quality values. The water quality data will be used to help establish best management practices for dredging during construction.

Water quality samples will be collected at eight locations along the sampling route, at approximately every third sample station at an average interval of every 3 miles. For every water quality sample location, 3 different depth intervals of the water column will be characterized for a total of 24 water quality samples. The sample intervals will include the sediment and water interface 1-2 feet from the bottom, a depth ½ the distance from the bottom interface to the water surface, and a grab sample from the water surface. The water quality sample locations may change depending on the amount of locations sampled each day since holding times on certain water analyses are very short (< 6 hours) and samples will need to be shipped to the lab immediately following collection. Therefore, the water quality samples maybe collected from the last sample location of each field day. It is estimated that 1-3 locations will be sampled each day.

4.4 Benthic Investigation

The purpose of the benthic investigation is to characterize the existing habitat by evaluation of the biota including any threatened or endangered species.

Benthic samples will be collected approximately every mile along the proposed pipeline route, with modifications incorporated to account for differing sediment types. Samples will be collected in triplicate: one sample on the centerline of the route(s) and two additional samples at 200-foot intervals on each side of the centerline route.

Based upon the proposed spacing approximately, 22 locations will be sampled in triplicate. This will yield approximately 66 samples available for analysis.

Table 4-1 Sample Location and Media Summary

Location	Number of Samples from Media Type			
	Geotechnical	Sediment Composite Core	Surface Water	Benthics
1	1	1	3	3
2	1	1	No sample	3
3	1	1	No sample	3
4	1	1	3	3
5	1	1	No sample	3
6	1	1	No sample	3
7	1	1	3	3
8	1	1	No sample	3
9	1	1	No sample	3
10	1	1	3	3
11	1	1	No sample	3
12	1	1	No sample	3
13	1	1	3	3
14	1	1	No sample	3
15	1	1	No sample	3
16	1	1	3	3
17	1	1	No sample	3
18	1	1	No sample	3
19	1	1	3	3
20	1	1	No sample	3
21	1	1	No sample	3
22	1	1	3	3
Total Samples	**22**	**22**	**24**	**66**

5 Field Methodology and Analytical Parameters

5.1 Geotechnical Investigations

5.1.1 Collection Method

Geotechnical samples will be collected with a vibracore sampling system. Vibracoring systems are the preferred method of core collection because they are much quicker than conventional drilling methods and provide a continuous, relatively undisturbed, core sample. Vibracore samples are also preferable to piston or gravity cores because vibracore systems generally achieve better penetration into the bottom sediments. All retrieval, classification and testing of vibracores shall be in accordance with relevant ASTM standards and under the supervision of a geotechnical engineer.

5.1.2 Procedure/Equipment

A geotechnical survey will be conducted across the entire distance of the pipeline route. This survey will be performed from a 100 foot survey vessel using a vibracore sampling system. Samples will be collected to a depth of 10 feet below the bottom or point of refusal and may extend to 15 feet depending on sample recovery during collection. Based on current design Broadwater believes that the proposed 10-foot core depth will be adequate, given that the pipeline burial depth range will range between 4-7 feet below the existing seafloor.
Positioning during sampling will be performed with a Trimble DGPS system. The marine survey and navigation software package, Hypack will be used for navigation, survey control and ship track recording.

A vibracoring system consists of a vibratory head, a power source, and a weight stand to keep the core barrel in a vertical position. The sampling vessel will be positioned on the sampling location using DGPS (accuracy of ± 10-20 feet). The coordinates, sample number, water depth, stage of the tide, time and the weather conditions will be noted in a field logbook.

Assuming 10-foot samples, a 10-foot long, 4” OD steel core barrel will be employed. Prior to use, this barrel will be cleaned with a wash down pump or pressure washer. Following the cleaning of the core barrel a new rigid, polycarbonate core liner will be inserted into the core barrel. A stainless steel core catcher will then be inserted into the end of the barrel and riveted in place. Because of the direct contact with sample material, the core nose catcher assembly will be carefully washed with soap (Alconox) and water to remove any debris prior to the collection of each sample.

The vibracorer will then be hoisted or lifted over the side of the vessel and deployed into the water column. When the core nose reaches the bottom the vibracore unit will be turned on and the start time noted. The coring operation is complete when desired depth is reached or when point of refusal is encountered. Point of refusal is defined as the depth at which penetration is less than 6 inches over a one-minute period.

Once the core has been completed the vibracorer is turned off and extracted slowly from the bottom by the lift cables. As the vibracore system is retrieved and lifted out of the water, it is hosed down with site water prior to bringing the unit on board and laying it down horizontally on the work platform.

After the unit has been laid on deck and blocked, the rivets are chiseled or drilled out and the core catcher removed. The rigid liner is then pulled from the core barrel, excess liner on the top and bottom is cut and removed and the ends capped and taped.

Following the inspection and the logging of the sample, the core will be cut in thirds, yielding approximately three, three-foot sections. Each section will be capped and taped and the top and bottom of each section will be duly noted with indelible ink on the polycarbonate liner.

In addition to the geotechnical samples collected with the vibracore, an in-situ test method will also be performed in the field using the cone penetrometer test.
A cone penetrometer test (CPT) involves the deployment of a 3 foot by 4 foot CPT unit from the sampling vessel. The unit will rest on the sound floor at each sample location and collect real-time data through the use of a 2.5 cm (head size) probe for approximately 30 minutes. The small probe will penetrate the sound floor to the depth of pipeline installation or greater, depending on the density of the material encountered. If the materials exhibit properties of muck rather than a silt or sand, the probe may go deeper into the material to collect data on the density. Once the data collection is complete, the unit will be raised from the sound floor and placed back on the boat deck until the next sample location. The CPT will be completed concurrently with the collection of the vibracore samples for both the geotechnical and environmental chemistry analysis. Since the CPT is an in-situ test, no sediments will be collected or brought on board, as part of the sampling effort.

5.1.3 Documentation/Sample IDs

All cores will be visually inspected, with individual horizons or strata measured and documented in the field notebook. Specific field information will be collected at each core location and recorded in the sediment core log. The sediment core log will be a combination of either the geotechnical vibracore collected with the hard polycarbonate liner or the sediment chemistry core collected with the flexible food grade polyethylene core liner as described in Section 5.2. The information recorded will include:

- Project and boring identification,
- Latitude/Longitude coordinates of the sample location,
- Digital photographs of each sample,
- Type of equipment used to obtain sample,
- Visual classification of each major soil type encountered in accordance with the Unified Soil Classification System,
- Depth at which major changes in soil type occur,
- Field-testing results of pocket penetrometer and torvane test,
- Water depth and sea state,
- Core penetration length,
- Core recovery length,
- Presence of debris, contaminants or living organisms.

A unique, alphanumeric, sample identification number will be provided for each individual sample. All pertinent information associated with this sample will be entered into the sample log system, such as client name, date/time, sample description, and initials of person entering data. This number will be recorded on the core tube using an indelible marker. The numbering system shall consist of the station number followed by a dash (-) followed by either 0-1 for the first foot section, 1-4 for the top section, or 4-7 for the middle section; and 7-10 for the bottom section. This number will be followed by the letter "G" for geotechnical. Below is the proposed list of sample IDs for the geotechnical cores.

Table 5-1 Geotechnical Sample Identification Numbers

Location	Sample ID 0- to 1-Foot Increment	Sample ID 1- to 4-Foot Increment	Sample ID 4- to 7-Foot Increment	Sample ID 7- to 10-Foot Increment
1	01-D0-1G	01-D1-4G	01-D4-7G	01-D7-10G
2	02-D0-1G	02-D1-4G	02-D4-7G	02-D7-10G
3	03-D0-1G	03-D1-4G	03-D4-7G	03-D7-10G
4	04-D0-1G	04-D1-4G	04-D4-7G	04-D7-10G

Table 5-1 Geotechnical Sample Identification Numbers

Location	Sample ID 0- to 1-Foot Increment	Sample ID 1- to 4-Foot Increment	Sample ID 4- to 7-Foot Increment	Sample ID 7- to 10-Foot Increment
5	05-D0-1G	05-D1-4G	05-D4-7G	05-D7-10G
6	06-D0-1G	06-D1-4G	06-D4-7G	06-D7-10G
7	07-D0-1G	07-D1-4G	07-D4-7G	07-D7-10G
8	08-D0-1G	08-D1-4G	08-D4-7G	08-D7-10G
9	09-D0-1G	09-D1-4G	09-D4-7G	09-D7-10G
10	10-D0-1G	10-D1-4G	10-D4-7G	10-D7-10G
11	11-D0-1G	11-D1-4G	11-D4-7G	11-D7-10G
12	12-D0-1G	12-D1-4G	12-D4-7G	12-D7-10G
13	13-D0-1G	13-D1-4G	13-D4-7G	13-D7-10G
14	14-D0-1G	14-D1-4G	14-D4-7G	14-D7-10G
15	15-D0-1G	15-D1-4G	15-D4-7G	15-D7-10G
16	16-D0-1G	16-D1-4G	16-D4-7G	16-D7-10G
17	17-D0-1G	17-D1-4G	17-D4-7G	17-D7-10G
18	18-D0-1G	18-D1-4G	18-D4-7G	18-D7-10G
19	19-D0-1G	19-D1-4G	19-D4-7G	19-D7-10G
20	20-D0-1G	20-D1-4G	20-D4-7G	20-D7-10G
21	21-D0-1G	21-D1-4G	21-D4-7G	21-D7-10G
22	22-D0-1G	22-D1-4G	22-D4-7G	22-D7-10G

5.1.4 Sample Shipping

The 3-foot lexan tubes of sediment will be stored on-board the sampling vessel in an upright position, with the tops/bottoms capped, taped, and sealed. On a daily basis samples will be transferred from the sampling vessel to on-shore storage aboard a refrigerated truck. No less than once per week, the geotechnical samples will be crated and shipped to the designated geotechnical laboratory. Prior to shipment a chain of custody shall be completed containing the following information: Sample Identification, Date/Time Sample Collection, Type of sample, Sample collection location, and the number of samples/or/ containers. The chain of custody shall be signed by the person collecting the samples, a copy retained by this person, with the remaining carbon copies of the form accompanying the samples to the lab.

5.1.5 Analytical Parameters

Pocket penetrometer and torvane test will be conducted, in the field, as cores are retrieved onto the sampling vessel. Pocket penetrometers are small handheld devices used in the field to evaluate consistency and approximate unconfined compressive strength of saturated cohesive soils. The Torvane is a hand-held vane shear device for rapid determination of shear strength in cohesive soils either in the laboratory or the field.

The following is a list of proposed geotechnical tests to be conducted by a geotechnical laboratory once sample collection is complete. The geotechnical analysis will be determined in the field by a geotechnical engineer based on the field characterization of the soil. The first one-foot interval will only be analyzed for soil classification parameters. The remaining intervals will be analyzed for soil classification parameters and one measurement of shear strength. Select samples from the bottom of the cores will be analyzed for soil resistivity.

Table 5-2 Geotechnical Analysis Methods

Test Description	ASTM/Method Number	Estimated Number of Samples
Soil Description and Classification (ASTM D2487 classification also is performed with some associated tests)	ASTM D2488 or D3282	90
Water Content	ASTM D2216	90
Consistency Determination (Torvane and pocket penetrometer)		10
Standard Laboratory Vane	ASTM D4648	60
Total (Bulk) Unit Weight from tube sample (with Water Content)	ASTM D2937	75
CIU - Consolidated-Isotropically Undrained Triaxial with backpressure and pore water pressure measurements on a single saturated specimen; price per point	ASTM D4767	12
Combined Sieve and Hydrometer Analysis	ASTM D422	12
Direct Shear - (2.5 inch diameter specimen) 3 stages, compacted cohesionless material; price per point	ASTM D3080	45
Maximum and Minimum Index Unit Weight, cohesionless material	ASTM D4253	10
Specific Gravity of minus No. 4 sieve material	ASTM D854	12
Standard Triaxial Permeability (Hydraulic Conductivity) cohesive material	ASTM D5084	12
Constant Head Permeability Reconstituted specimen with conductivity> 1 x 10-5 cm/sec, tested in rigid-wall permeameter	ASTM D2434	5
One dimensional Consolidation	ASTM D2435	48
Resistivity	G57	30

5.1.6 QA/QC

The laboratory conducting the geotechnical analyses will be accredited by the Army Corps of Engineers or American Association of State Highway and Transportation Officials (AASHTO).

The laboratory shall follow the quality control procedures specified by the method to be performed. If the method does not specify any quality control procedures, the laboratory shall develop and implement quality control procedures. At minimum the quality control program shall consist of the following:

- • Appropriate SOPs in place;

- • Appropriate staff training and documentation;
- • Proper equipment calibration and maintenance;
- • Approved analytical procedures are followed;
- • Facilities are adequate; and,
- • Appropriate health and safety procedures are implemented.

If QA/QC audits or checks identify any deficiencies, deviations or non-conformance events, corrective action will be taken to correct a deficiency and minimize the possibility of reoccurrence. The laboratory will notify E & E immediately of any impacts to the geotechnical results for the project.

5.2 Sediment Chemistry Samples

5.2.1 Collection Method

Samples for chemistry will be collected with a vibracore sampling system as described in Section 5.1. Instead of a hard polycarbonate liner, the sediment chemistry core will be collected with the flexible food grade polyethylene core liner (bag tubes) to allow for easier sample logging and preparation.

Following the inspection and the logging of the sample, the sediment samples for chemical analysis will be collected. The samples will be collected in a specific order to comply with method requirements. Samples for volatile compounds will be collected first as a composite from the entire core, followed by a sample for dioxin analysis, which will be collected from the area of the core containing the highest clay/silt content. Following collection of these samples, the entire core will be composited in a dedicated bucket and mixed with a stainless steel mixer. All other sediment chemical analysis will be collected from this composite mixture. Care will be taken to ensure the level of sediment moisture is above 50%. These samples will be placed immediately in a cooler and shipped to a laboratory for analysis at the end of each field day.

It is important to note that not every sediment sample will be analyzed for dioxin. The samples with the highest silt/clay content will be determined in the field, and samples will be collected from those cores for dioxin analysis. Dioxin samples have a 1-year holding time when stored under appropriate conditions. If any of the analyzed samples test positive for dioxin, additional dioxin analysis will be performed on other cores with the nearest clay/silt content.

5.2.2 Documentation/Sample IDs

All cores will be visually inspected, with individual horizons or strata measured and documented in the field notebook. Other basic information collected will include:

- Project and boring sample identification,
- Latitude/Longitude coordinates of the sample location,
- Digital photographs of each sample,
- Type of equipment used to obtain sample,
- Visual classification of each major soil type encountered in accordance with the Unified Soil Classification System,
- Water depth and sea state,
- Core penetration length,
- Core recovery length, and
- Presence of debris, contaminants or living organisms.

All of this information will be recorded on a sediment core log as described in Section 5.1.3.

A unique, alphanumeric, sample identification number will be provided for each individual sample. All pertinent information associated with this sample will be entered into the sample log system, such as client name, date/time, sample description, and initials of person entering data. This number will be recorded on the core tube using an indelible marker. The numbering system shall consist of the station number followed by a dash (-) followed by either 0-1 for the first foot section, 1-4 for the top section, or 4-7 for the middle section; and 7-10 foot for the bottom section. The letter "E" for will follow this number for environmental. Below is the proposed list of sample IDs for the environmental cores.

Table 5-3 Sediment Sample Identification Numbers

Location	Sample ID 0- to 1-Foot Increment	Sample ID 1- to 4-Foot Increment	Sample ID 4- to 7-Foot Increment	Sample ID 7- to 10-Foot Increment
1	01-D0-1E	01-D1-4E	01-D4-7E	01-D7-10E
2	02-D0-1E	02-D1-4E	02-D4-7E	02-D7-10E
3	03-D0-1E	03-D1-4E	03-D4-7E	03-D7-10E
4	04-D0-1E	04-D1-4E	04-D4-7E	04-D7-10E
5	05-D0-1E	05-D1-4E	05-D4-7E	05-D7-10E
6	06-D0-1E	06-D1-4E	06-D4-7E	06-D7-10E
7	07-D0-1E	07-D1-4E	07-D4-7E	07-D7-10E
8	08-D0-1E	08-D1-4E	08-D4-7E	08-D7-10E
9	09-D0-1E	09-D1-4E	09-D4-7E	09-D7-10E

Table 5-3 Sediment Sample Identification Numbers

Location	Sample ID 0- to 1-Foot Increment	Sample ID 1- to 4-Foot Increment	Sample ID 4- to 7-Foot Increment	Sample ID 7- to 10-Foot Increment
10	10-D0-1E	10-D1-4E	10-D4-7E	10-D7-10E
11	11-D0-1E	11-D1-4E	11-D4-7E	11-D7-10E
12	12-D0-1E	12-D1-4E	12-D4-7E	12-D7-10E
13	13-D0-1E	13-D1-4E	13-D4-7E	13-D7-10E
14	14-D0-1E	14-D1-4E	14-D4-7E	14-D7-10E
15	15-D0-1E	15-D1-4E	15-D4-7E	15-D7-10E
16	16-D0-1E	16-D1-4E	16-D4-7E	16-D7-10E
17	17-D0-1E	17-D1-4E	17-D4-7E	17-D7-10E
18	18-D0-1E	18-D1-4E	18-D4-7E	18-D7-10E
19	19-D0-1E	19-D1-4E	19-D4-7E	19-D7-10E
20	20-D0-1E	20-D1-4E	20-D4-7E	20-D7-10E
21	21-D0-1E	21-D1-4E	21-D4-7E	21-D7-10E
22	22-D0-1E	22-D1-4E	22-D4-7E	22-D7-10E

5.2.3 Sample Shipping

Samples will be shipped to the laboratory for analysis at the end of each field day. Prior to shipment, a chain of custody shall be completed containing the following information: Sample Identification, Date/Time Sample Collection, Type of sample, Sample collection location, and the number of samples/or/ containers. The person collecting the samples shall sign the chain of custody and retain a copy, while the remaining carbon copies of the form will accompany the samples.

5.2.4 Analytical Parameters

Chemical analyses that will be conducted on composite sediment cores include selected metals, PAHs, pesticides, PCBs and dioxin. The detailed listing of analytes and analytical methods is provided below.

Table 5-4 Sediment Sample Chemical Analysis

Test Description	EPA Method Number	Required Method Detection Limits (mg/kg, ppm)	No Appreciable Contamination (Threshold Values (mg/kg, ppm)	Laboratory Reporting Limit (mg/kg, ppm)
Arsenic	EPA 6010B	1.0	<14	0.37 (MDL)
Cadmium	EPA 6010B	0.5	<1.2	0.2
Copper	EPA 6010B	2.5	<33	1.0
Lead	EPA 6010B	5.0	<33	1.0
Mercury	EPA 6010B	0.2	<0.17	0.02
Benzene	EPA 8260B	0.002	<0.59	0.000813 (MDL)
Total BTX	EPA 8260B	0.002	<0.96	0.00182
Total PAH (Sum of Target Compound List	EPA 8270C	0.33	<4	0.33

Table 5-4 Sediment Sample Chemical Analysis

Test Description	EPA Method Number	Required Method Detection Limits (mg/kg, ppm)	No Appreciable Contamination (Threshold Values (mg/kg, ppm)	Laboratory Reporting Limit (mg/kg, ppm)
PAH)				
Sum of DDT+DDE+DDD	EPA 8081A	0.029	<0.003	0.0017
Mirex	EPA 8081A	0.189	<0.0014	0.0017
Chlordane	EPA 8081A	0.031	<0.003	0.017
Dieldrin	EPA 8081A	0.019	<0.11	0.0017
PCBs (sum of aroclors)	EPA 8082	0.025	<0.1	0.017
Dioxin (Toxicity Equivalency Total calculated from PCDD/PCDF congeners)	EPA 1613B	0.000002	<0.0000045	**0.00000086**
Total Organic Carbon (TOC)	Lloyd Kahn	NA	NA	500
Grain size	ASTM D422 -63	NA	NA	NA
Salinity	EPA 2520	NA	NA	NA
pH	EPA 9045C	NA	NA	0.1
Anions (Chloride, Sulfate, Nitrate, Nitrite)	EPA 9056	NA	NA	5=0.5 to 20

Note: Threshold values lower than the Method Detection Limits are superseded by the Method Detection Limit.

All analyses will be conducted on all composite sediment cores with the exception of dioxin analysis. Dioxin analysis will only be performed on samples containing the highest clay or silt content and not on samples containing a high amount of sand or gravel. This determination will be made in the field by the sampling team. Samples marked for dioxin analysis will be noted in daily field summaries and if a positive dioxin result is found in a sample, additional dioxin analysis will be run on other sediment cores at a later date in accordance with sample holding time.

5.2.5 QA/QC Samples

The exact number of samples sent for QA/QC analysis may vary depending on the total number of composite samples collected, but at least one of every 10 sediment samples collected for chemical analysis will contain a duplicate samples and one sample out of every 20 will be collected for MS/MSD analysis. The samples will be collected from the composite sample core. A core sample with sufficient volume recovery will be chosen for field QC. These sample details are noted in the sample listing tables. An equipment rinsate sample will not be collected because the sample liner is disposable. The sample container and holding time requirements are listed in Table 5-5.

The laboratory for sediment chemical analysis will be approved by New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation

Program (ELAP) for Solid and Hazardous Waste and Contract Laboratory Program. The samples will be analyzed in accordance with NYSDEC Analytical Services Protocol (ASP) June 2000 and reported according to Level B deliverables. All data reviewed for usability in accordance with NYSDEC Data Review Guidelines and appropriate qualifiers added.

All sample reporting limits, after sample specific correction, for the laboratory will be below the method detection limits listed on Table 5-4. The laboratory will report the results in dry weight. If necessary the laboratory will compensate for a dry weight determination by analyzing appropriate amount of sample material. High levels of percent moisture will be reported to the E & E QA Director for evaluation prior to analysis.

If QA/QC audits or checks identify any deficiencies, deviations or non-conformance events, corrective action will be taken to correct a deficiency and minimize the possibility of reoccurrence. The laboratory will notify E & E immediately of any impacts to the geotechnical results for the project.

Table 5-5 Sediment Sample Container and Holding Times

Test Description	Type and Size of Container	Number of Containers and Volume (per sample)	Preservative	Holding Time (1)
Arsenic	4-oz glass jar with Teflon-lined cap	One; fill completely	Cool to 4°C	6 Months
Cadmium				
Copper				
Lead				
Mercury				26 Days
Benzene	2-oz glass jar with Teflon-lined cap cleaned for VOAs	Two; fill completely	Cool to 4°C	5 Days
Total BTX				
PAH	8-oz amber glass jar with Teflon-lined cap	One; fill completely	Cool to 4°C	Extract within 5 days, analyze within 40 days
DDT+DDE+DDD				
Mirex				
Chlordane				
Dieldrin				
PCBs				
Dioxin	4-oz amber glass jar with Teflon-lined cap	One; fill completely	Cool to 4°C	Extract within 30 days, analyze within 1 year
Grain size and TOC	16-oz glass jar with Teflon-lined cap	One; fill completely	Cool to 4°C	NA
Salinity and pH	4-oz glass jar with Teflon-lined cap	One; fill completely	Cool to 4°C	ASAP

5.3 Surface Water Samples

5.3.1 Collection Method

Prior to sample collection, a YSI meter will be deployed for field measurements of water quality as listed on Table 5-7. The water measurements will be made with a YSI 6820 Sonde and the data will be recorded on a YSI 650 MDS data logger. The field measurements will be collected at three discrete locations in the water column as described in Section 4.3. Surface water samples for physical and biological analysis (Table 5-7) will be collected using an oil-less pump made of inert materials, suspended at 3 depths in the water column for appropriate sample collection. Other methods such as alpha or kemmerer bottles could be used but because of the volume of water required the use of a pump is suggested. The water being collected will be transported through Teflon tubing and collected into 5-gallon food grade plastic containers and subsequently transferred to the appropriate sample bottles. Immediately upon collection into the sample bottles, water samples will be refrigerated in an onboard cooler.

5.3.2 Procedure / Equipment

The sampling vessel will be positioned on the sampling location using DGPS (accuracy of ± 10-20 feet). The coordinates, sample number, water depth, stage of the tide, time and the weather conditions will be noted in a field logbook.

The oil-less pump will be dropped over the side of the vessel with a rope tether. Once the pump reaches the desired depth, the pump will be turned on and water will be pushed through the dedicated Teflon tubing to the ship where the water will be collected in a 5-gallon, food grade plastic container.

Once retrieved on board the vessel, the pump and Teflon tubing will be rinsed with D.I. water prior to deploying this equipment at the next sampling station.

5.3.3 Documentation/Sample IDs

The actual locations that water samples are collected from will be noted in the field logbook and be reflected in the sample ID. Listed below in Table 5-6 is a preliminary list of sample locations and sample IDs naming convention that will be used during the field effort but the station locations are likely subject to change due to the holding time restrictions on many of the water analysis. Therefore, the actual sample ID will indicate which stations the sample came from and will be determined by field progress and what station the field team is on at the end of each day.

Table 5-6 Surface Water Sample Identification

Location	Sample ID
1	01-DB-1W
1	01-DM-1W
1	01-DS-1W
4	04-DB-4W

Table 5-6 Surface Water Sample Identification

Location	Sample ID
4	04-DM-4W
4	04-DS-4W
7	07-DB-7W
7	07-DM-7W
7	07-DS-7W
10	10-DB-10W
10	10-DM-10W
10	10-DS-10W
13	13-DB-13W
13	13-DM-13W
13	13-DS-13W
16	16-DB-16W
16	16-DM-16W
16	16-DS-16W
19	19-DB-19W
19	19-DM-19W
19	19-DS-19W
22	22-DB-22W
22	22-DM-22W
22	22-DS-22W

5.3.4 Sample Shipping

The water samples will be stored on the vessel under refrigeration and at the end of each day these containers will be transferred to a nearby on-shore laboratory for analysis within the sample holding time. Prior to shipment a chain of custody shall be completed containing the following information: Sample Identification, Date/Time Sample Collection, Type of sample, Sample collection location, and the number of samples/or/ containers. The chain of custody shall be signed by the person collecting the samples, and this person will retain a copy, with the remaining carbon copies of the form accompanying the samples.

5.3.5 Analytical Parameters

The parameters analyzed for will include physical and biological water quality parameters. Chemical analyses will not be performed on water samples since there is no indication of a source or non-point source within the potential pipeline route that would chemically impact water quality. Also, it is generally not beneficial to characterize the chemical components in an open water environment that is constantly changing and these results would only indicate a snapshot of water quality at the time of sampling.

The detailed listing of analytes for physical and biological analyses that will be conducted on water quality samples and the analytical methods are provided below.

Table 5-7 Water Sample Analysis

Test Description	EPA Method Number	Laboratory Reporting Limits (mg/L)
Turbidity	Field Test	
pH	Field Test	
Temperature	Field Test	
Dissolved Oxygen	Field Test	
Total Suspended Solids (TSS)	EPA 160.2	10
Colloidal Solids	EPA 160.2/160.5	10
Settleable Solids	EPA 160.5	0.1
Chlorides	EPA 300	0.5
Total Organic Nitrogen	EPA 351.2/350.3	0.1
Total Phosphorus	EPA 365.2	0.01
Fecal Coliform Bacteria	SM9221C	1 colony/100 mL
Total Coliform Bacteria	SM9221B	1 colony/100 mL
Biological oxygen demand	EPA 405.1	2
Chemical oxygen demand	EPA 410.4	10
Ammonia (as N)	EPA 350.3	0.05

5.3.6 QA/QC Samples

The number of samples sent for QA/QC analysis will include one duplicate sample and one MS/MSD sample. These sample details are noted sample listing table.

The laboratory for water chemical analysis will be approved by NYSDOH ELAP for Non-Potable Water for the methods listed on Table 5-6. The samples will be analyzed in accordance with NYSDEC ASP June 2000 and reported according to Level A deliverables. All data will be reviewed for usability in accordance with NYSDEC Data Review Guidelines and appropriate qualifiers added.

All sample reporting limits for the laboratory will be below the method detection limits listed on Table 5-7. Sample container and bottle requirements are listed on Table 5-8. The sample shipping person must ensure samples reach the laboratory prior to sample holding times expiring. Samples should not be collected near the weekend unless prior arrangements are made with the laboratory to ensure holding times are met.

If QA/QC audits or checks identify any deficiencies, deviations or non-conformance events, corrective action will be taken to correct a deficiency and minimize the possibility of reoccurrence. The laboratory will notify E & E immediately of any impacts to the geotechnical results for the project.

Table 5-8 Sample Container and Bottle Requirements

Test Description	Type and Size of Container	Number of Containers and Volume (per sample)	Preservative	Holding Time (1)
Total Suspended Solids (TSS)	1-L HPDE	One; fill completely	Cool to 4°C	5 days
Colloidal Solids				
Settleable Solids				
Fecal Coliform Bacteria	1-L HPDE	Two; fill completely	Cool to 4°C	6 hours
Total Coliform Bacteria				
Chlorides	1-L HPDE	One; fill completely	Cool to 4°C	26 days
Total Organic Nitrogen				
Biological oxygen demand	250 Amber Glass with Teflon Lined Lid	One; fill completely	Cool to 4°C ,	24 hours
Chemical oxygen demand, Total Phosphorus, Ammonia (as N)	1-L HPDE	One; fill completely	Cool to 4°C , H2SO4 to pH<2	26 days

5.4 Benthic Community Analysis

The purpose of the benthic community analysis is to ascertain the health of the existing benthic community along the proposed pipeline route. This data combined with the sediment chemical analysis will be used to assess the overall quality, or degree of contamination and potential impact from disturbance of the sediments during pipeline installation.

5.4.1 Collection Method

For benthic community structure analysis, grab samples will be collected. A Smith-MacIntyre grab sampler (0.1 square meter [m^2]) will be used, rather than a smaller ponar or Eckman, due to the water depths and expected hardness of the bottom sediments.

5.4.2 Procedure/Equipment

The sampling vessel will be positioned on the sampling location using DGPS (accuracy of ± 10-20 feet). The coordinates, sample number, water depth, stage of the tide, time and the weather conditions will be noted in a field log book.

The Smith-Mac sampler will be hoisted with a boom or winch over the side and allowed to freefall through the water column to the bottom. Upon impact with the bottom the trigger on the spring loaded jaws will be activated and the sampler will grab a 0.1 sq meter section of the bottom.

The sampler will be slowly hoisted through the water column, to the surface, and then brought over the side of the vessel where the contents of the sampler will then be emptied into a clean catch basin. Once in the catch-basin the contents will be carefully poured into a bucket sieve.

The bucket sieve consists of a 1000 micron sieve, nested over a 500 micron sieve. Using large amounts of site water, the sample is gently washed through the sieves. Any material that flows through the 500 micron sieve is discarded. The material retained on both the 500 and 1000 micron sieves is collected and transferred to a 2 liter plastic container (larger sized containers will be available in case sample volumes cannot be reduced sufficiently) and the liquid volume reduced to 50% of the container volume. A twenty percent formalin solution will then be added until the container is filled resulting in a 10% formalin concentration.

Following this preservation step, the sample container will then be labeled and stored in an on-board cooler until the end of the day, when they will be transferred to on-shore storage in a refrigerated truck.

5.4.3 Documentation/Field Sample IDs

A unique, 2-3 alphanumeric, sample identification number will be provided for each individual sample. All pertinent information associated with this sample will be entered into the sample log system, such as client name, date/time, sample description, and initials of person entering data. This number will be recorded on the sample container(s) using an indelible marker. The numbering system shall consist of the letter B (for benthic), followed by the station number followed by "C" for center line, "N" for north of the centerline or "S" for south of the centerline. Below is the proposed list of sample IDs for the benthic samples.

Table 5-9 Benthic Sample Identification

Location	Sample ID Centerline	Sample ID North of Centerline	Sample ID South of Centerline
1	B1-C	B1-N	B1-S
2	B2-C	B2-N	B2-S
3	B3-C	B3-N	B3-S
4	B4-C	B4-N	B4-S
5	B5-C	B5-N	B5-S
6	B6-C	B6-N	B6-S
7	B7-C	B7-N	B7-S
8	B8-C	B8-N	B8-S
9	B9-C	B9-N	B9-S
10	B10-C	B10-N	B10-S
11	B11-C	B11-N	B11-S
12	B12-C	B12-N	B12-S
13	B13-C	B13-N	B13-S
14	B14-C	B14-N	B14-S
15	B15-C	B15-N	B15-S
16	B16-C	B16-N	B16-S
17	B17-C	B17-N	B17-S
18	B18-C	B18-N	B18-S
19	B19-C	B19-N	B19-S
20	B20-C	B20-N	B20-S
21	B21-C	B21-N	B21-S

Table 5-9 Benthic Sample Identification

Location	Sample ID Centerline	Sample ID North of Centerline	Sample ID South of Centerline
22	B22-C	B22-N	B22-S

5.4.4 Sample Shipment

The sample coolers containing the containers of sediment for benthic taxonomy will be offloaded from the vessel each evening and stored in a refrigerated truck. At designated times this truck will transport the samples to Aqua Survey, Inc. Prior to shipment a chain of custody shall be completed containing the following information: Sample Identification, Date/Time Sample Collection, Type of sample, Sample collection location, and the number of samples/or/ containers. The chain of custody shall be signed by the person collecting the samples, and a copy retain by this person, with the remaining carbon copies of the form accompanying the samples.

5.4.5 Analytical Parameters

Benthic taxonomic identification will be performed on organisms isolated in each sample. Organisms will be keyed to the lowest practical taxa. If more than 100 organisms are found in a particular sample, that sample will be sub-sampled and all of the organisms in the sub-sample keyed. Data from the triplicate samples will enable statistical analysis to be performed. The following community metrics will be performed:

- • Abundance,
- • Richness,
- • Shannon Weiner Diversity, and
- • Evenness.

In addition to the taxonomy work, grain size and total organic carbon analysis will be performed on each sample to aid in interpretation of the data collected.

5.4.6 QA/QC Analysis

Ten percent of all samples, or approximately 7, will be randomly selected and sent to an outside, experienced, third party for independent taxonomic verification. If there is more than a 10% difference in individual sample results received from the outside lab taxonomist, the QA officer will arrange for a review of the identification procedures and achieve a consensus between the two taxonomists. This may result in the review of certain organisms within all of the samples.

The QA unit will provide a final data and report audit prior to the issuance of the final report.

6 Field Reporting Requirements

6.1 Field Reporting Requirements

Field notes and daily field summaries will be submitted to the project team from the Aqua Survey team and the E & E sample team on –board the sample vessel.

6.2 Geotechnical Reporting Requirements

Geotechnical reporting requirements that will be included as part of the final report are:

- • Detailed description of methods and calculations for each engineering analysis performed,
- • Field test results, including Undrained Shear Strength,
- • Laboratory test results, including Undrained Shear Strength
- • Relative Density
- • General soil stratigraphy
- • Design soil strength properties, including recommended shear strength, internal friction angle for sands, effective cohesion and effective friction angle
- • Identification of potential liquefaction areas along the pipeline route
- • Recommendation of coefficient of friction between concrete coated line pipe and the seabed soil
- • Recommendation for trench wall slopes for trenched pipeline ditches

B Complete Laboratory Results

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-1 04/29/05	C-2 04/22/05	C-3 04/28/05	C-3D 04/28/05	C-4 04/22/05
Metals (ppm)							
Aluminum - Total	NA		7500	5670	7550	4900	7900
Arsenic - Total	14		5.4	2.4 J	3.6	4.3	5.0 J
Barium - Total	NA		23.7 J	15.9 J	22.6 J	14.8 J	23.6 J
Beryllium - Total	NA		0.39	0.30	0.40	0.25	0.40
Calcium - Total	NA		2350 J	1200 J	2070 J	1410 J	2950 J
Chromium - Total	NA		16.3	12.0 J	16.0	12.2	26.5 J
Cobalt - Total	NA		6.5	4.1 J	6.3	4.8	7.0 J
Copper - Total	33		8.1	4.6 J	7.8	10.6	28.8 J
Iron - Total	NA		15100 J	10000	14600 J	9480 J	15300
Lead - Total	33		5.9	3.7	5.7	6.5	18.6
Magnesium - Total	NA		5500 J	3730 J	5460 J	3360 J	5490 J
Manganese - Total	NA		409 J	175	326 J	214 J	419
Sodium - Total	NA		5750	4660 J	4940	3120	5710 J
Nickel - Total	NA		11.8	8.3 J	11.9	8.8	13.4 J
Potassium - Total	NA		2640	1970 J	2580	1550	2580 J
Vanadium - Total	NA		22.5 J	14.3 J	22.9 J	14.8 J	21.6 J
Zinc - Total	NA		33.5	23.1 J	34.3	30.4	70.7 J
Mercury - Total	0.2		0.016 U	0.011 U	0.026	0.063	0.040
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		14000	7920	6370	7950	6940

Key:

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U = Not detected at the reported value.

ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-4D 04/22/05	IC-5 04/29/05	IC-6 04/27/05	IC-7 04/27/05	MG-5 04/21/05
Metals (ppm)							
Aluminum - Total	NA		6960	7880	4090	5820	1840
Arsenic - Total	14		5.2 J	5.6	3.0 J	3.7 J	1.2 J
Barium - Total	NA		21.4 J	21.0	12.7 J	29.6 J	4.2 J
Beryllium - Total	NA		0.36	0.42	0.21 J	0.29 J	0.11 U
Calcium - Total	NA		2570 J	4540	1680	6230	725 J
Chromium - Total	NA		15.4 J	17.8	8.3 J	11.6 J	5.0 J
Cobalt - Total	NA		6.4 J	8.5	4.3 J	5.9 J	1.7 J
Copper - Total	33		9.0 J	11.2	3.5 J	10.3 J	5.8 J
Iron - Total	NA		13800	16800	8000	11800	3790
Lead - Total	33		6.2	8.1	3.1 J	4.6 J	3.7
Magnesium - Total	NA		5200 J	5370	2830	4100	1180 J
Manganese - Total	NA		312	284	163	377	60.4
Sodium - Total	NA		4690 J	5270	2810	4330	2070 J
Nickel - Total	NA		11.4 J	14.3	7.1 J	10.4 J	3.2 J
Potassium - Total	NA		2240 J	2860	1340 J	1650 J	639 J
Vanadium - Total	NA		18.5 J	22.0	11.2 J	16.6 J	5.5 J
Zinc - Total	NA		34.5 J	43.7	18.1 J	28.0 J	15.5 J
Mercury - Total	0.2		0.021	0.014	0.011 U	0.017 U	0.012 U
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		8640	4330	4310	7040	665

Key:

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(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	MG-3 04/20/05	IC-13 04/30/05	IC-14 04/30/05	C-15 04/26/05	C-16 04/26/05
Metals (ppm)							
Aluminum - Total	NA		2840	5180	12000	5240 J	6810 J
Arsenic - Total	14		1.3 U	4.6	6.4	4.2	5.9
Barium - Total	NA		9.8 J	13.8	35.2	15.3	18.8
Beryllium - Total	NA		0.14	0.30	0.60	0.26	0.33
Calcium - Total	NA		704 J	3520	4230	1700 J	2580 J
Chromium - Total	NA		5.5 J	14.0	27.5	14.2	14.5
Cobalt - Total	NA		1.6 J	5.3	11.7	4.4	5.9
Copper - Total	33		6.4 J	10.9	15.6	18.3	6.2
Iron - Total	NA		4230	10900	23800	10000 J	13900 J
Lead - Total	33		2.4	7.7	11.0	9.6	4.6
Magnesium - Total	NA		1200 J	3370	8740	3500 J	4900 J
Manganese - Total	NA		51.3	186	546	175 J	244 J
Sodium - Total	NA		1730 J	5190	7770	3680	4550
Nickel - Total	NA		3.9 J	8.1	18.6	8.6	11.1
Potassium - Total	NA		843 J	1940	4000	1670 J	2220 J
Vanadium - Total	NA		7.0 J	18.0	32.5	14.1	18.4
Zinc - Total	NA		11.2 J	34.4	62.1	41.5	28.9
Mercury - Total	0.2		0.012 U	0.012	0.015	0.036	0.020
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		644 U	1640	3990	7690	9510

Key:

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ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-16D 04/26/05	C-17 04/24/05	C-18 04/19/05	C-19 04/19/05	C-20 04/21/05
Metals (ppm)							
Aluminum - Total	NA		8360 J	8030 J	1230	1630	2940
Arsenic - Total	14		7.6	4.8	1.3 U	1.2 U	2.3 J
Barium - Total	NA		23.2	22.5 J	3.5 J	5.7 J	8.0 J
Beryllium - Total	NA		0.42	0.42	0.13 U	0.14	0.17
Calcium - Total	NA		2650 J	2520 J	241 J	540 J	783 J
Chromium - Total	NA		18.3	18.2	2.6 J	4.3 J	8.4 J
Cobalt - Total	NA		6.7	5.9	1.6	1.9	2.9 J
Copper - Total	33		11.7	9.1	2.7	3.4	7.8 J
Iron - Total	NA		16300 J	14900 J	3290 J	4170 J	7100
Lead - Total	33		7.4	6.5	2.2	2.3	4.2
Magnesium - Total	NA		5560 J	5190 J	790	876	1760 J
Manganese - Total	NA		249 J	246 J	35.3 J	51.5 J	78.7
Sodium - Total	NA		6010	5820	1860	2980	2110 J
Nickel - Total	NA		13.6	12.6	2.6	2.8	5.5 J
Potassium - Total	NA		2700 J	2680 J	288	505	940 J
Vanadium - Total	NA		23.1	21.7	6.2	9.3	9.2 J
Zinc - Total	NA		42.5	37.1	5.6	9.5	20.3 J
Mercury - Total	0.2		0.017 U	0.016 U	0.011 U	0.010 U	0.012
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		9910	11100	10400	7100	2440

Key:

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(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: / Date:	C-21 05/01/05	C-22 05/01/05	C-23 05/03/05	C-24 05/03/05	C-25 05/04/05
Metals (ppm)							
Aluminum - Total	NA		6730	12400	12000	11500	11900
Arsenic - Total	14		3.6	7.1	5.4	6.5	6.3
Barium - Total	NA		12.6	36.7	34.4	32.8	34.0
Beryllium - Total	NA		0.33	0.66	0.58	0.55	0.59
Calcium - Total	NA		1880	7040	3820	3780	3220
Chromium - Total	NA		11.6	29.2	27.3	24.6	25.6
Cobalt - Total	NA		6.7	10.9	8.1	7.9	8.0
Copper - Total	33		15.1	13.9	14.4	12.0	10.6
Iron - Total	NA		13600	24900	21000	20200	21000
Lead - Total	33		9.8	11.7	9.7	7.7	7.4
Magnesium - Total	NA		4010	9220	7640	7090	7500
Manganese - Total	NA		167	475	329	324	291
Sodium - Total	NA		3990	7870	8440	8370	8840
Nickel - Total	NA		10.8	18.0	17.9	17.4	17.6
Potassium - Total	NA		1780	4460	3990	3820	4100
Vanadium - Total	NA		22.2	34.4	30.6	30.9	30.2
Zinc - Total	NA		36.4	57.4	53.9	46.6	47.6
Mercury - Total	0.2		0.011 U	0.012 U	0.022	0.016 U	0.019 U
Total Organic Carbon (ppm)							
Total Organic Carbon	NA		2910	12400	11100	10700	9780

Key:

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ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 1
Complete Analytical Results for Metals in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-26 05/03/05	C-27 05/02/05	C-28 05/02/05
Metals (ppm)					
Aluminum - Total	NA		11000	10700	10700
Arsenic - Total	14		6.9	6.7	7.1
Barium - Total	NA		33.1	31.7	30.4
Beryllium - Total	NA		0.54	0.52	0.50
Calcium - Total	NA		2680	2830	3600
Chromium - Total	NA		24.8	23.3	23.1
Cobalt - Total	NA		7.7	7.6	7.3
Copper - Total	33		12.4	10.4	13.2
Iron - Total	NA		20000	19900	18800
Lead - Total	33		8.5	6.7	8.1
Magnesium - Total	NA		6910	6690	6500
Manganese - Total	NA		308	272	268
Sodium - Total	NA		7910	6670	7510
Nickel - Total	NA		16.9	16.3	16.1
Potassium - Total	NA		3790	3570	3450
Vanadium - Total	NA		28.6	28.3	27.0
Zinc - Total	NA		48.1	44.2	47.0
Mercury - Total	0.2		0.017 U	0.015 U	0.017 U
Total Organic Carbon (ppm)					
Total Organic Carbon	NA		10400	10000	8260

Key:
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ppm = parts per million

Note:
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(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	C-1 04/29/05	C-2 04/22/05	C-3 04/28/05	C-3D 04/28/05	C-4 04/22/05	C-4D 04/22/05
Volatiles (ppm)								
Benzene	0.59		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0040 U
Ethylbenzene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0040 U
m/p-Xylenes	0.96		0.010 U	0.0090 U	0.010 U	0.010 U	0.010 U	0.0080 U
o-Xylene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0040 U
Toluene	0.96		0.0030 J	0.013	0.0040 J	0.054	0.027	0.0010 J
Total BTX	0.96		0.003	0.013	0.004	0.054	0.027	0.001
Total Xylenes	0.96		0.015 U	0.014 U	0.015 U	0.015 U	0.015 U	0.013 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
2-Methylnaphthalene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Acenaphthene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Acenaphthylene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Anthracene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Benzo(a)anthracene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Benzo(a)pyrene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Benzo(b)fluoranthene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Benzo(ghi)perylene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Benzo(k)fluoranthene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Chrysene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Fluorene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Dibenzo(a,h)anthracene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Fluoranthene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Indeno(1,2,3-cd)pyrene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Naphthalene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Phenanthrene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Pyrene	4		0.29 U	0.34 U	0.32 U	0.31 U	0.36 U	0.37 U
Total PAH	4		0.29	0.34	0.32	0.31	0.36	0.37

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-1 04/29/05	C-2 04/22/05	C-3 04/28/05	C-3D 04/28/05	C-4 04/22/05	C-4D 04/22/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0028 U	0.0017 U	0.0026 U	0.0026 U	0.0018 U	0.0019 U
4,4'-DDE	0.029		0.0028 U	0.0017 U	0.0026 U	0.0026 U	0.0018 U	0.0019 U
4,4'-DDT	0.029		0.0028 U	0.0017 U	0.0026 U	0.0026 U	0.0018 U	0.0019 U
Sum of DDT+DDE+DDD	0.029		0.0028	0.0017	0.0026	0.0026	0.0018	0.0019
Chlordane	0.031		0.028 U	0.017 U	0.026 U	0.026 U	0.018 U	0.019 U
Dieldrin	0.11		0.0028 U	0.0017 U	0.0026 U	0.0026 U	0.0018 U	0.0019 U
Chlordane	0.031		0.028 U	0.017 U	0.026 U	0.026 U	0.018 U	0.019 U
Mirex	0.189		0.0028 U	0.0017 U	0.0026 U	0.0026 U	0.0018 U	0.0019 U
PCBS (ppm)								
Aroclor 1016	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1221	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1232	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1242	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1248	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1254	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
Aroclor 1260	0.1		0.014 U	0.017 U	0.013 U	0.013 U	0.018 U	0.019 U
PCBs (sum of aroclors)	0.1		0.014	0.017	0.013	0.013	0.018	0.019

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Note:
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Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [(1)]	Sample ID: Date:	IC-5 04/29/05	IC-6 04/27/05	IC-7 04/27/05	MG-5 04/21/05	MG-3 04/20/05	IC-13 04/30/05
Volatiles (ppm)								
Benzene	0.59		0.0050 U	0.0040 U	0.0050 U	0.0040 U	0.0040 U	0.0050 U
Ethylbenzene	0.96		0.0050 U	0.0040 U	0.0050 U	0.0040 U	0.0040 U	0.0050 U
m/p-Xylenes	0.96		0.010 U	0.0080 U	0.010 U	0.0090 U	0.0090 U	0.010 U
o-Xylene	0.96		0.0050 U	0.0040 U	0.0050 U	0.0040 U	0.0040 U	0.0050 U
Toluene	0.96		0.049	0.022	0.0040 J	0.010	0.0080	0.0020 J
Total BTX	0.96		0.049	0.004	0.004	0.01	0.008	0.002
Total Xylenes	0.96		0.014 U	0.013 U	0.014 U	0.013 U	0.014 U	0.015 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
2-Methylnaphthalene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Acenaphthene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Acenaphthylene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Anthracene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Benzo(a)anthracene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Benzo(a)pyrene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Benzo(b)fluoranthene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Benzo(ghi)perylene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Benzo(k)fluoranthene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Chrysene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Fluorene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Dibenzo(a,h)anthracene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Fluoranthene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Indeno(1,2,3-cd)pyrene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Naphthalene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Phenanthrene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Pyrene	4		0.30 U	0.32 U	0.28 U	0.30 U	0.30 U	0.29 U
Total PAH	4		0.3	0.32	0.28	0.3	0.3	0.29

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	IC-5 04/29/05	IC-6 04/27/05	IC-7 04/27/05	MG-5 04/21/05	MG-3 04/20/05	IC-13 04/30/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0015 U	0.0017 U	0.0018 U	0.0015 U	0.0015 U	0.0015 U
4,4'-DDE	0.029		0.0015 U	0.0017 U	0.0018 U	0.0015 U	0.0015 U	0.0015 U
4,4'-DDT	0.029		0.0015 U	0.0017 U	0.0018 U	0.0015 U	0.0015 U	0.0015 U
Sum of DDT+DDE+DDD	0.029		0.0015	0.0017	0.0018	0.0015	0.0015	0.0015
Chlordane	0.031		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Dieldrin	0.11		0.0015 U	0.0017 U	0.0018 U	0.0015 U	0.0015 U	0.0015 U
Chlordane	0.031		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Mirex	0.189		0.0015 U	0.0017 U	0.0018 U	0.0015 U	0.0015 U	0.0015 U
PCBS (ppm)								
Aroclor 1016	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1221	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1232	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1242	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1248	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1254	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
Aroclor 1260	0.1		0.015 U	0.017 U	0.018 U	0.015 U	0.015 U	0.015 U
PCBs (sum of aroclors)	0.1		0.015	0.017	0.018	0.015	0.015	0.015

Key:
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ppm = parts per million

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	IC-14 04/30/05	C-15 04/26/05	C-16 04/26/05	C-16D 04/26/05	C-17 04/24/05	C-18 04/19/05
Volatiles (ppm)								
Benzene	0.59		0.0050 U	0.0040 U	0.0050 U	0.0050 U	0.0050 U	0.0060 U
Ethylbenzene	0.96		0.0050 U	0.0040 U	0.0050 U	0.0050 U	0.0050 U	0.0060 U
m/p-Xylenes	0.96		0.010 U	0.0090 U	0.010 U	0.010 U	0.010 U	0.012 U
o-Xylene	0.96		0.0050 U	0.0040 U	0.0050 U	0.0050 U	0.0050 U	0.0060 U
Toluene	0.96		0.0040 J	0.0060	0.0030 J	0.0060	0.0080	0.075
Total BTX	0.96		0.004	0.006	0.003	0.006	0.008	0.075
Total Xylenes	0.96		0.014 U	0.014 U	0.015 U	0.015 U	0.015 U	0.018 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
2-Methylnaphthalene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Acenaphthene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Acenaphthylene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Anthracene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Benzo(a)anthracene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Benzo(a)pyrene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Benzo(b)fluoranthene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Benzo(ghi)perylene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Benzo(k)fluoranthene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Chrysene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Fluorene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Dibenzo(a,h)anthracene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Fluoranthene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Indeno(1,2,3-cd)pyrene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Naphthalene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Phenanthrene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Pyrene	4		0.28 U	0.32 U	0.31 U	0.33 U	0.39 U	0.30 U
Total PAH	4		0.28	0.32	0.31	0.33	0.39	0.3

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	IC-14 04/30/05	C-15 04/26/05	C-16 04/26/05	C-16D 04/26/05	C-17 04/24/05	C-18 04/19/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0014 U	0.0016 U	0.0018 U	0.0020 U	0.0019 U	0.0015 UJ
4,4'-DDE	0.029		0.0014 U	0.0016 U	0.0018 U	0.0020 U	0.0019 U	0.0015 UJ
4,4'-DDT	0.029		0.0014 U	0.0016 U	0.0018 U	0.0020 U	0.0019 U	0.0015 UJ
Sum of DDT+DDE+DDD	0.029		0.0014	0.0016	0.0018	0.002	0.0019	0.0015
Chlordane	0.031		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Dieldrin	0.11		0.0014 U	0.0016 U	0.0018 U	0.0020 U	0.0019 U	0.0015 UJ
Chlordane	0.031		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Mirex	0.189		0.0014 U	0.0016 U	0.0018 U	0.0020 U	0.0019 U	0.0015 UJ
PCBS (ppm)								
Aroclor 1016	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1221	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1232	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1242	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1248	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1254	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
Aroclor 1260	0.1		0.014 U	0.016 U	0.018 U	0.020 U	0.019 U	0.015 UJ
PCBs (sum of aroclors)	0.1		0.014	0.016	0.018	0.02	0.019	0.015

Key:
J = Estimated value.
U = Not detected at the reported value.
ppm = parts per million

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-19 04/19/05	C-20 04/21/05	C-21 05/01/05	C-22 05/01/05	C-23 05/03/05	C-24 05/03/05
Volatiles (ppm)								
Benzene	0.59		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Ethylbenzene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
m/p-Xylenes	0.96		0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
o-Xylene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Toluene	0.96		0.016	0.0050	0.020	0.13	0.0050 U	0.0050
Total BTX	0.96		0.016	0.005	0.02	0.13	0.015	0.005
Total Xylenes	0.96		0.015 U	0.014 U	0.014 U	0.014 U	0.015 U	0.014 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
2-Methylnaphthalene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Acenaphthene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Acenaphthylene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Anthracene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Benzo(a)anthracene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Benzo(a)pyrene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Benzo(b)fluoranthene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Benzo(ghi)perylene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Benzo(k)fluoranthene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Chrysene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Fluorene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Dibenzo(a,h)anthracene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Fluoranthene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Indeno(1,2,3-cd)pyrene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Naphthalene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Phenanthrene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Pyrene	4		0.32 U	0.34 U	0.31 U	0.30 U	0.30 U	0.30 U
Total PAH	4		0.32	0.34	0.31	0.3	0.3	0.3

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: / Date:	C-19 04/19/05	C-20 04/21/05	C-21 05/01/05	C-22 05/01/05	C-23 05/03/05	C-24 05/03/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0016 UJ	0.0017 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U
4,4'-DDE	0.029		0.0016 UJ	0.0017 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U
4,4'-DDT	0.029		0.0016 UJ	0.0017 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U
Sum of DDT+DDE+DDD	0.029		0.0016	0.0017	0.0016	0.0015	0.0016	0.0015
Chlordane	0.031		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Dieldrin	0.11		0.0016 UJ	0.0017 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U
Chlordane	0.031		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Mirex	0.189		0.0016 UJ	0.0017 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U
PCBS (ppm)								
Aroclor 1016	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1221	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1232	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1242	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1248	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1254	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
Aroclor 1260	0.1		0.016 UJ	0.017 U	0.016 U	0.015 U	0.015 U	0.015 U
PCBs (sum of aroclors)	0.1		0.016	0.017	0.016	0.015	0.015	0.015

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-25 05/04/05	C-26 05/03/05	C-27 05/02/05	C-28 05/02/05	C-6 05/05/05	C-8 04/19/05
Volatiles (ppm)								
Benzene	0.59		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Ethylbenzene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
m/p-Xylenes	0.96		0.010 U	0.010 U	0.0090 U	0.0090 U	0.010 U	0.010 U
o-Xylene	0.96		0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Toluene	0.96		0.0020 J	0.0050 U	0.0050 U	0.0050 U	0.0040 J	0.014
Total BTX	0.96		0.002	0.015	0.014	0.014	0.004	0.014
Total Xylenes	0.96		0.015 U	0.015 U	0.014 U	0.014 U	0.015 U	0.015 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
2-Methylnaphthalene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Acenaphthene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Acenaphthylene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Anthracene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Benzo(a)anthracene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Benzo(a)pyrene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Benzo(b)fluoranthene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Benzo(ghi)perylene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Benzo(k)fluoranthene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Chrysene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Fluorene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Dibenzo(a,h)anthracene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Fluoranthene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Indeno(1,2,3-cd)pyrene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Naphthalene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Phenanthrene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Pyrene	4		0.32 U	0.30 U	0.32 U	0.25 U	0.29 U	0.36 U
Total PAH	4		0.32	0.3	0.32	0.25	0.29	0.36

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	C-25 05/04/05	C-26 05/03/05	C-27 05/02/05	C-28 05/02/05	C-6 05/05/05	C-8 04/19/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0016 U	0.0015 U	0.0017 U	0.0014 U	0.0015 U	0.0015 UJ
4,4'-DDE	0.029		0.0016 U	0.0015 U	0.0017 U	0.0014 U	0.0015 U	0.0015 UJ
4,4'-DDT	0.029		0.0016 U	0.0015 U	0.0017 U	0.0014 U	0.0015 U	0.0015 UJ
Sum of DDT+DDE+DDD	0.029		0.0016	0.0015	0.0017	0.0014	0.0015	0.0015
Chlordane	0.031		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Dieldrin	0.11		0.0016 U	0.0015 U	0.0017 U	0.0014 U	0.0015 U	0.0015 UJ
Chlordane	0.031		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Mirex	0.189		0.0016 U	0.0015 U	0.0017 U	0.0014 U	0.0015 U	0.0015 UJ
PCBS (ppm)								
Aroclor 1016	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1221	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1232	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1242	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1248	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1254	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
Aroclor 1260	0.1		0.016 U	0.015 U	0.017 U	0.014 U	0.015 U	0.015 UJ
PCBs (sum of aroclors)	0.1		0.016	0.015	0.017	0.014	0.015	0.015

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	ENV-1 04/18/05	ENV-2 04/17/05	ENV-3 04/17/05	C-9 04/18/05	ENV-4 04/17/05	ENV-5 04/17/05
Volatiles (ppm)								
Benzene	0.59		0.044	0.0050 U	0.0050 U	0.0040 U	0.0040 U	0.0040 U
Ethylbenzene	0.96		0.013	0.0050 U	0.0050 U	0.0040 U	0.0040 U	0.0040 U
m/p-Xylenes	0.96		0.22	0.010 U	0.0090 U	0.0090 U	0.0090 U	0.0090 U
o-Xylene	0.96		0.10	0.0050 U	0.0040 U	0.0040 U	0.0040 U	0.0040 U
Toluene	0.96		0.14 J	0.0050 U	0.0080 J	0.020 J	0.0040 U	0.0040 J
Total BTX	0.96		0.747	0.014	0.017	0.02	0.013	0.004
Total Xylenes	0.96		0.33	0.014 U	0.014 U	0.014 U	0.013 U	0.013 U
Semivolatiles (ppm)								
2-Chloronaphthalene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
2-Methylnaphthalene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Acenaphthene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Acenaphthylene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Anthracene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Benzo(a)anthracene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Benzo(a)pyrene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Benzo(b)fluoranthene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Benzo(ghi)perylene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Benzo(k)fluoranthene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Chrysene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Fluorene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Dibenzo(a,h)anthracene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Fluoranthene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Indeno(1,2,3-cd)pyrene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Naphthalene	4		0.32 U	0.35 U	0.31 U	0.34 U	0.32 U	0.36 U
Phenanthrene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Pyrene	4		0.32 U	0.35 U	0.34 U	0.34 U	0.32 U	0.36 U
Total PAH	4		0.32	0.35	0.34	0.34	0.32	0.36

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	ENV-1 04/18/05	ENV-2 04/17/05	ENV-3 04/17/05	C-9 04/18/05	ENV-4 04/17/05	ENV-5 04/17/05
Pesticides (ppm)								
4,4'-DDD	0.029		0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0011 U	0.0012 U
4,4'-DDE	0.029		0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0011 U	0.00055 J
4,4'-DDT	0.029		0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0011 U	0.0012 U
Sum of DDT+DDE+DDD	0.029		0.0011	0.0012	0.00057	0.0012	0.0011	0.00055
Chlordane	0.031		0.011 U	0.012 U	0.011 U	0.012 U	0.011 U	0.012 U
Dieldrin	0.11		0.0011 U	0.0012 U	0.0011 U	0.0012 U	0.0011 U	0.0012 U
Chlordane	0.031		0.011 U	0.012 U	0.011 U	0.012 U	0.011 U	0.012 U
Mirex	0.189		0.0011 U	0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0012 U
PCBS (ppm)								
Aroclor 1016	0.1		0.016 U	0.018 U	0.016 U	0.017 U	0.016 U	0.018 U
Aroclor 1221	0.1		0.016 U	0.018 U	0.016 U	0.017 U	0.016 U	0.018 U
Aroclor 1232	0.1		0.016 U	0.018 U	0.016 U	0.017 U	0.016 U	0.018 U
Aroclor 1242	0.1		0.016 U	0.018 U	0.017 U	0.017 U	0.016 U	0.018 U
Aroclor 1248	0.1		0.016 U	0.018 U	0.016 U	0.017 U	0.016 U	0.018 U
Aroclor 1254	0.1		0.016 U	0.018 U	0.017 U	0.017 U	0.016 U	0.018 U
Aroclor 1260	0.1		0.016 U	0.018 U	0.016 U	0.017 U	0.016 U	0.018 U
PCBs (sum of aroclors)	0.1		0.016	0.018	0.017	0.017	0.016	0.018

Key:
J = Estimated value.
U = Not detected at the reported value.
ppm = parts per million

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	C-12 05/04/05
Volatiles (ppm)			
Benzene	0.59		0.0040 U
Ethylbenzene	0.96		0.0040 U
m/p-Xylenes	0.96		0.0090 U
o-Xylene	0.96		0.0040 U
Toluene	0.96		0.0020 J
Total BTX	0.96		0.002
Total Xylenes	0.96		0.014 U
Semivolatiles (ppm)			
2-Chloronaphthalene	4		0.29 U
2-Methylnaphthalene	4		0.29 U
Acenaphthene	4		0.29 U
Acenaphthylene	4		0.29 U
Anthracene	4		0.29 U
Benzo(a)anthracene	4		0.29 U
Benzo(a)pyrene	4		0.29 U
Benzo(b)fluoranthene	4		0.29 U
Benzo(ghi)perylene	4		0.29 U
Benzo(k)fluoranthene	4		0.29 U
Chrysene	4		0.29 U
Fluorene	4		0.29 U
Dibenzo(a,h)anthracene	4		0.29 U
Fluoranthene	4		0.29 U
Indeno(1,2,3-cd)pyrene	4		0.29 U
Naphthalene	4		0.29 U
Phenanthrene	4		0.29 U
Pyrene	4		0.29 U
Total PAH	4		0.29

Table 2
Complete Analytical Results for Organics in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-12 05/04/05
Pesticides (ppm)			
4,4'-DDD	0.029		0.0014 U
4,4'-DDE	0.029		0.0014 U
4,4'-DDT	0.029		0.0014 U
Sum of DDT+DDE+DDD	0.029		0.0014
Chlordane	0.031		0.014 U
Dieldrin	0.11		0.0014 U
Chlordane	0.031		0.014 U
Mirex	0.189		0.0014 U
PCBS (ppm)			
Aroclor 1016	0.1		0.014 U
Aroclor 1221	0.1		0.014 U
Aroclor 1232	0.1		0.014 U
Aroclor 1242	0.1		0.014 U
Aroclor 1248	0.1		0.014 U
Aroclor 1254	0.1		0.014 U
Aroclor 1260	0.1		0.014 U
PCBs (sum of aroclors)	0.1		0.014

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ppm = parts per million

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	C-1-D4-5 04/29/05	C-2-D4-5 04/22/05	C-3-D4-5 04/28/05	C-3D-D4-5 04/28/05	C-4-D4-4.8 04/22/05
Salanity (S)							
Salinity	NA		5.5	4.0	5.4	5.8	4.2
Anions (mg/Kg)							
Chloride	NA		14000	3630	9440	7680	4890
Sulfate	NA		2070	486	281	1270	726
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		2.2	1.0 U	1.5 U	1.5 U	1.5
Leachable Nitrite	NA		1.7 U	2.1	1.5 U	1.5 U	4.0
pH (S.U)							
Leachable pH	NA		8.30	8.43	7.89	8.45	8.33

Key:
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- mg/Kg = Milligrams per kilogram.
- S.U. = Standard Unit
- S = Salinity

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-4D-D4-4.8 04/22/05	IC-5-D2-2.7 04/29/05	IC-6-D4-5 04/27/05	IC-7-D4-5 04/27/05	MG-5-D3-4 04/21/05
Salanity (S)							
Salinity	NA		3.8	4.2	4.3	3.4	3.9
Anions (mg/Kg)							
Chloride	NA		2720	5420	4070	6750	1770
Sulfate	NA		364	865	150	963	272
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		2.6	1.2 U	1.1	1.0 U	1.0 U
Leachable Nitrite	NA		3.3	1.2 U	1.2 U	1.4 U	1.4
pH (S.U)							
Leachable pH	NA		8.40	8.34	8.34	8.20	7.89

Key:
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- mg/Kg = Milligrams per kilogram.
- S.U. = Standard Unit
- S = Salinity

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	MG-3-D2.2-2.8 04/20/05	IC-13-D2-2.7 04/30/05	IC-14-D4-5 04/30/05	C-15-D4-5 04/26/05	C-16-D4-5 04/26/05
Salanity (S)							
Salinity	NA		3.5	3.6	4.5	5.1	5.2
Anions (mg/Kg)							
Chloride	NA		1460	3500	7890	6220	5450
Sulfate	NA		238	558	1310	1130	604
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		2.3	1.1 U	1.6	1.7	1.5 U
Leachable Nitrite	NA		1.2 U	1.1 U	1.4 U	1.3 U	1.5 U
pH (S.U)							
Leachable pH	NA		7.81	7.36	8.15	8.08	8.19

Key:
J = Estimated value.
U = Not detected at the reported value.
mg/Kg = Milligrams per kilogram.
S.U. = Standard Unit
S = Salinity

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria [1]	Sample ID: Date:	C-16D-D4-5 04/26/05	C-17-D4-4.3 04/24/05	C-18-D2.3-3.3 04/19/05	C-19-D3.5-4.5 04/19/05	C-20-D4-4.9 04/21/05
Salanity (S)							
Salinity	NA		4.6	4.5	3.5	2.5	3.5
Anions (mg/Kg)							
Chloride	NA		6220	3510	2000	1130	1470
Sulfate	NA		867	414	302	164	198
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		1.7 U	2.1	1.2 U	1.2 U	1.1
Leachable Nitrite	NA		1.7 U	1.5 U	1.2 U	1.2 U	1.5
pH (S.U)							
Leachable pH	NA		8.09	8.25	7.26	7.94	7.70

Key:
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mg/Kg = Milligrams per kilogram.
S.U. = Standard Unit
S = Salinity

Note:
Shaded cells exceed the screening value.

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Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-21-D2.4-3.4 05/01/05	C-22-D3-4 05/01/05	C-23-D4-5 05/03/05	C-24-D4-5 05/03/05	C-25-D4-5 05/04/05
Salanity (S)							
Salinity	NA		3.0	3.2	6.6	6.0	5.3
Anions (mg/Kg)							
Chloride	NA		2870	6710	8310	7040	13800
Sulfate	NA		422	1230	1170	1020	1610
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		1.1 U	1.3 U	2.7	2.0	1.6
Leachable Nitrite	NA		1.1 U	1.3 U	1.0 U	1.8 U	1.8 U
pH (S.U)							
Leachable pH	NA		7.36	8.42	8.00	8.07	8.22

Key:
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mg/Kg = Milligrams per kilogram.
S.U. = Standard Unit
S = Salinity

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Shaded cells exceed the screening value.

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Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-26-D4-5 05/03/05	C-27-D4-5 05/02/05	C-28-D4-5 05/02/05	C-6-D4-5 05/05/05	C-8-D4-5 04/19/05
Salanity (S)							
Salinity	NA		6.2	6.1	5.1	4.1	2.0 U
Anions (mg/Kg)							
Chloride	NA		8590	13300	13300	5600	3800
Sulfate	NA		1130	1940	1960	759	421
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		1.5	1.8	1.8	1.3 U	1.5 U
Leachable Nitrite	NA		1.7 U	4.8	1.6 U	1.3 U	1.5 U
pH (S.U)							
Leachable pH	NA		8.06	8.09	8.09	7.94	8.08

Key:
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mg/Kg = Milligrams per kilogram.
S.U. = Standard Unit
S = Salinity

Note:
Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	ENV-1-D4-5 04/18/05	ENV-2-D4-5 04/17/05	ENV-3-D4-5 04/17/05	ENV-3D-D4-5 04/17/05	C-9-D4-5 04/18/05
Salanity (S)							
Salinity	NA		3.1	3.7	4.3		4.6
Anions (mg/Kg)							
Chloride	NA		2480	3060	4240	4330	3990
Sulfate	NA		396	317	664	607	495
Nitrate/Nitrite (mg/Kg)							
Leachable Nitrate	NA		1.2 U	1.4 U	1.4 U	1.4 U	1.5 U
Leachable Nitrite	NA		1.2 U	1.4 U	1.4 U	1.4 U	1.5 U
pH (S.U)							
Leachable pH	NA		7.57	8.18	8.35	8.21	8.30

Key:
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- mg/Kg = Milligrams per kilogram.
- S.U. = Standard Unit
- S = Salinity

Note:
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Table 3
Complete Analytical Results for Physical Sediment Parameters, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: / Date:	ENV-4-D4-5 04/17/05	ENV-5-D4-5 04/17/05	C-12-D4-5 05/04/05
Salanity (S)					
Salinity	NA		5.4	6.0	4.1
Anions (mg/Kg)					
Chloride	NA		3910	5380	6220
Sulfate	NA		431	710	993
Nitrate/Nitrite (mg/Kg)					
Leachable Nitrate	NA		1.5 U	1.4 U	1.3 U
Leachable Nitrite	NA		1.5 U	1.4 U	1.3 U
pH (S.U)					
Leachable pH	NA		8.26	8.30	8.08

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/Kg = Milligrams per kilogram.

S.U. = Standard Unit

S = Salinity

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 4
Complete Analytical Results for Water Samples, Broadwater 2005

Analyte	Screening Criteria (1)	C-1-DS-W 04/29/05	C-1-DM-W 04/29/05	C-1-DB-W 04/29/05	C-3-DS-W 04/22/05	C-3-DM-W 04/22/05	C-3-DB-W 04/22/05
Anions (mg/L)							
Chloride	NA	22400	24200	25500	21900	28300	25800
Sulfate	NA	2860	3350	3680	3080	3930	3500
General Analytical (mg/L)							
Ammonia	NA	0.020 U	0.025	0.035	0.020 U	0.020 U	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	838 J	1070 J	1020 J	739 J	843 J	739 J
Colloidal Solids	NA	8.0	4.0 U	4.0	13.0 J	4.0 UJ	5.0 J
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U	13.0 J	10 UJ	10 UJ
Total Organic Nitrogen	NA	0.63	0.72	0.61	0.16	0.21	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	27600	28700	28500	29600	32900	28900

Note:
Shaded cells exceed the screening value.

Key:
J = Estimated value.
U = Not detected at the reported value.
mg/L = Milligrams per liter.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004.

Table 4
Complete Analytical Results for Water Samples, Broadwater 2005

Analyte	Screening Criteria (1)	IC-6-DS-W 04/27/05	IC-6-DM-W 04/27/05	IC-6-DB-W 04/27/05	MG-5D-DS-W 04/21/05	MG-5D-DM-W 04/21/05
Anions (mg/L)						
Chloride	NA	21300	26900	27400	24900	26500
Sulfate	NA	2640	3310	3380	3360	3250
General Analytical (mg/L)						
Ammonia	NA	0.020 U	0.020 U	0.027	0.020 U	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	634 J	1600 J	1830 J	659 J	782 J
Colloidal Solids	NA	4.0 U	4.0 U	4.0 U	4.0 J	33.0 J
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U	53.0 J	17.0 J
Total Organic Nitrogen	NA	0.69	0.71	0.63	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	- -	- -	- -	40800	30900

Note:
Shaded cells exceed the screening value.

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004.

Table 4
Complete Analytical Results for Water Samples, Broadwater 2005

Analyte	Screening Criteria (1)	MG-5-DB-W 04/21/05	C-15-DS-W 04/26/05	C-15-DM-W 04/26/05	C-15-DB-W 04/26/05	C-19-DS-W 04/19/05
Anions (mg/L)						
Chloride	NA	24600	23000	28800	32400	24600
Sulfate	NA	3800	3100	3960	4180	3000
General Analytical (mg/L)						
Ammonia	NA	0.020 U	0.020 U	0.020 U	0.052	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	843 J	1850 J	3430 J	1540 J	890 J
Colloidal Solids	NA	12.0 J	21.0	6.0	5.0	28.0 J
Non-Filterable Residue (103 C)	NA	12.0 J	21.0	10 U	10 U	28.0 J
Total Organic Nitrogen	NA	0.15	0.80	0.57	0.62	0.18
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	36800	- -	- -	- -	26500

Note:

Shaded cells exceed the screening value.

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004.

Table 4
Complete Analytical Results for Water Samples, Broadwater 2005

Analyte	Screening Criteria (1)	C-19-DM-W 04/19/05	C-19-DB-W 04/19/05	C-27-DS-W 05/02/05	C-27-DM-W 05/02/05	C-27-DB-W 05/02/05
Anions (mg/L)						
Chloride	NA	23700	28500	21300	29400	30700
Sulfate	NA	2980	3500	2880	3970	4340
General Analytical (mg/L)						
Ammonia	NA	0.038	0.060	0.020 U	0.026	0.020 U
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U	10.7	2.0 U
Chemical Oxygen Demand	NA	815 J	382 J	701 J	748 J	776 J
Colloidal Solids	NA	29.0 J	39.0 J	4.0 U	4.0 U	11.0
Non-Filterable Residue (103 C)	NA	29.0 J	39.0 J	10 U	10 U	11.0
Total Organic Nitrogen	NA	0.10 U	0.17	0.10 U	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Total Residue (103 C)	NA	27800	28700	536	28000	28200

Note:
Shaded cells exceed the screening value.

Key:
J = Estimated value.
U = Not detected at the reported value.
mg/L = Milligrams per liter.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004.

Table 4
Complete Analytical Results for Water Samples, Broadwater 2005

Analyte	Screening Criteria (1)	C-28-DS-W 05/02/05	C-28-DM-W 05/02/05	C-28-DB-W 05/02/05
Anions (mg/L)				
Chloride	NA	25500	32800	25200
Sulfate	NA	3520	4620	3520
General Analytical (mg/L)				
Ammonia	NA	0.020 U	0.020 U	0.026
Biochemical Oxygen Demand	NA	2.0 U	2.0 U	2.0 U
Chemical Oxygen Demand	NA	611 J	715 J	646 J
Colloidal Solids	NA	4.0 U	4.0 U	4.0 U
Non-Filterable Residue (103 C)	NA	10 U	10 U	10 U
Total Organic Nitrogen	NA	0.10 U	0.10 U	0.10 U
Total Phosphorous	NA	0.010 U	0.010 U	0.013
Total Residue (103 C)	NA	27100	28300	25600

Note:
Shaded cells exceed the screening value.

Key:

J = Estimated value.

U = Not detected at the reported value.

mg/L = Milligrams per liter.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004.

Table 5

Complete Analytical Results for Dioxin in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: Date:	C-1-D3-4 04/29/05	C-4-D2-3 04/22/05	C-4D-D2-3 04/22/05	IC-7-D2-3 04/27/05	IC-13-D0-1 04/30/05
SM1613B (ppm)							
1,2,3,7,8-PeCDD	NA		0.0000050 U	0.00000024 J	0.0000050 U	0.00000027 J	0.00000041 J
1,2,3,4,7,8-HxCDD	NA		0.00000010 J	0.00000024 J	0.0000050 U	0.0000050 U	0.00000060 J
1,2,3,6,7,8-HxCDD	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.00000059 J	0.0000014 J
1,2,3,7,8,9-HxCDD	NA		0.0000050 U	0.00000072 J	0.0000050 U	0.0000011 J	0.0000016 J
1,2,3,4,6,7,8-HpCDD	NA		0.0000026 J	0.0000084 J	0.0000027 J	0.000017	0.000029
OCDD	NA		0.000057 J	0.00021 J	0.000065 J	0.00041 J	0.00032 J
2,3,7,8-TCDF	NA		0.00000030 J	0.0000010 U	0.0000010 U	0.00000015 J	0.0000034
1,2,3,7,8-PeCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.0000014 J
2,3,4,7,8-PeCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.0000014 J
1,2,3,4,7,8-HxCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.00000014 J	0.0000021 J
1,2,3,6,7,8-HxCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.000000094 J	0.00000096 J
2,3,4,6,7,8-HxCDF	NA		0.0000050 U	0.00000010 J	0.0000050 U	0.0000050 U	0.0000010 J
1,2,3,4,6,7,8-HpCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000012 J	0.000015 J
1,2,3,4,7,8,9-HpCDF	NA		0.0000050 U	0.0000050 U	0.0000050 U	0.0000050 U	0.00000080 J
OCDF	NA		0.000010 U	0.000010 U	0.000010 U	0.000010 U	0.000033 J
Dioxin(Toxic Equivalency Total)	0.0000045		0.000000123	0.00000052	0.000000092	0.0000009344	0.000002882

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

Table 5
Complete Analytical Results for Dioxin in Sediment Samples, Broadwater 2005

Analyte	Screening Criteria (1)	Sample ID: / Date:	C-20-D0-1 04/20/05	C-24-D5-6 05/03/05	C-28-D2-3 05/02/05
SM1613B (ppm)					
1,2,3,7,8-PeCDD	NA		0.0000050 U	0.0000050 U	0.0000050 U
1,2,3,4,7,8-HxCDD	NA		0.0000050 U	0.00000023 J	0.00000019 J
1,2,3,6,7,8-HxCDD	NA		0.00000054 J	0.00000040 J	0.00000028 J
1,2,3,7,8,9-HxCDD	NA		0.00000098 J	0.00000097 J	0.00000079 J
1,2,3,4,6,7,8-HpCDD	NA		0.000013	0.000017	0.0000095
OCDD	NA		0.00018 J	0.00040 J	0.00025
2,3,7,8-TCDF	NA		0.0000010 U	0.0000010 U	0.0000010 U
1,2,3,7,8-PeCDF	NA		0.00000029 J	0.0000050 U	0.0000050 U
2,3,4,7,8-PeCDF	NA		0.00000048 J	0.0000050 U	0.0000050 U
1,2,3,4,7,8-HxCDF	NA		0.00000060 J	0.0000050 U	0.0000050 U
1,2,3,6,7,8-HxCDF	NA		0.00000053 J	0.0000050 U	0.0000050 U
2,3,4,6,7,8-HxCDF	NA		0.00000033 J	0.0000050 U	0.0000050 U
1,2,3,4,6,7,8-HpCDF	NA		0.0000044 J	0.0000012 J	0.00000081 J
1,2,3,4,7,8,9-HpCDF	NA		0.00000039 J	0.0000050 U	0.0000050 U
OCDF	NA		0.000010 J	0.000010 U	0.0000014 J
Dioxin(Toxic Equivalency Total)	0.0000045		0.0000009204	0.000000742	0.0000004805

Key:

J = Estimated value.

U = Not detected at the reported value.

ppm = parts per million

Note:

Shaded cells exceed the screening value.

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November 2004

C Seabird-CTD Water Quality Meter Data

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-1	5	48.821	9.345	27.777792	25.1272	XXXX	7.40894	75.86236	1.1937
C-1	10	48.7334	9.2963	27.593544	24.9772	8.843	10.5984	108.40701	1.9798
C-1	15	48.5391	9.1884	27.571319	25.0299	8.684	10.46104	106.77202	1.9536
C-1	20	47.8168	8.7871	27.375423	25.1151	8.668	10.29621	104.18638	1.9939
C-1	25	47.5437	8.6354	27.283946	25.1295	8.668	10.26948	103.56377	1.8739
C-1	30	47.002	8.3344	27.077985	25.1334	8.660	10.16623	101.818	1.9086
C-1	35	45.7821	7.6567	26.758155	25.2911	8.632	9.84398	97.15667	1.9128
C-1	40	44.7429	7.0794	26.511335	25.454	8.577	9.47172	92.30895	1.9092
C-1	45	44.149	6.7494	26.338343	25.5143	8.564	9.34624	90.41244	1.9525
C-1	50	43.2851	6.2695	26.164459	25.6867	8.535	9.11497	87.26732	1.9093
C-1	55	42.8358	6.0199	26.093419	25.7982	8.516	9.07968	86.4715	1.879
C-1	60	42.4169	5.7872	26.107074	25.9905	8.513	9.08684	86.1633	1.904
C-1	65	42.2802	5.7112	26.130432	26.074	8.521	9.21	87.21837	1.9132
C-1	70	42.1076	5.6154	26.102158	26.1165	8.519	9.26571	87.5667	1.9129
C-1	75	41.9568	5.5315	26.060265	26.1348	8.514	9.2892	87.62075	1.9187
C-1	80	41.7253	5.403	26.013607	26.1828	8.507	9.28173	87.30449	1.9528
C-1	85	41.6088	5.3382	25.98838	26.2048	8.499	9.29484	87.30241	1.9124
C-1	90	41.5268	5.2927	25.96674	26.2157	8.492	9.29817	87.2431	1.9129
C-1	95	41.4964	5.2758	25.960715	26.2217	8.484	9.30648	87.28842	1.916
C-1	100	41.4891	5.2717	25.959089	26.2224	8.477	9.31815	87.38963	1.9539
C-1	105	41.4855	5.2697	25.958685	26.2229	8.471	9.32419	87.44236	1.9536
C-1	110	41.4831	5.2684	25.958916	26.2235	8.465	9.33308	87.52329	1.9157
C-1	115	41.4843	5.2691	25.959509	26.223	8.460	9.3409	87.59774	1.9471
C-1	120	41.4846	5.2692	25.961897	26.2249	8.454	9.31821	87.38641	1.9536
C-2	5	51.1952	10.664	28.563499	24.9839	XXXX	6.02317	63.36798	1.1
C-2	10	50.4699	10.261	28.217795	24.9248	8.649	9.44762	98.73404	1.9714
C-2	15	49.8551	9.9195	28.104091	25.0484	8.563	9.45802	98.15394	1.9128
C-2	20	49.5883	9.7713	28.071525	25.1187	8.590	9.71467	100.52732	1.9092
C-2	25	49.2611	9.5895	27.869597	25.0452	8.608	9.86667	101.63589	1.9552
C-2	30	48.0001	8.8889	27.430482	25.0977	8.620	9.77789	99.15888	1.9536
C-2	35	47.5635	8.6464	27.333098	25.1703	8.610	9.8079	98.95986	1.9124
C-2	40	47.4329	8.5738	27.282702	25.1703	8.604	9.77503	98.46362	1.9542
C-2	45	47.034	8.3522	27.153843	25.1965	8.586	9.60637	96.28881	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-2	50	46.1467	7.8593	26.922995	25.3136	8.553	9.26767	91.9087	1.9074
C-2	55	45.1893	7.3274	26.825819	25.6002	8.517	9.04378	88.73731	1.9552
C-2	60	44.7252	7.0695	26.720447	25.6799	8.492	9.08513	88.65008	1.8714
C-2	65	43.9382	6.6323	26.524525	25.7983	8.473	8.96075	86.60105	1.8722
C-2	70	43.379	6.3216	26.4062	25.9055	8.457	8.91259	85.55799	1.9158
C-2	75	43.0606	6.1448	26.336439	25.9642	8.444	8.88314	84.94664	1.916
C-2	80	42.964	6.0911	26.320063	25.9869	8.439	8.88141	84.83293	1.9918
C-2	85	42.9472	6.0818	26.321992	25.9955	8.435	8.89331	84.9324	1.9545
C-2	90	42.9459	6.0811	26.321281	25.9947	8.430	8.90633	85.05485	1.9122
C-2	95	42.9505	6.0836	26.32276	25.9937	8.428	8.91195	85.11312	1.8832
C-2	100	42.9555	6.0864	26.324668	25.9931	8.426	8.92476	85.24089	1.9156
C-2	105	42.9394	6.0775	26.321183	25.9955	8.424	8.92781	85.25299	1.9532
C-2	110	42.9334	6.0741	26.318679	25.9947	8.422	8.9266	85.23412	1.9159
C-2	115	42.9327	6.0737	26.319296	25.9951	8.420	8.93001	85.26616	1.916
C-2	120	42.9313	6.0729	26.31818	25.9938	8.417	8.93831	85.34313	1.9088
C-3	5	47.8911	8.8284	27.493099	25.2062	XXXX	8.07951	81.82685	1.1414
C-3	10	47.8581	8.81	27.397569	25.1223	8.537	11.26019	114.00384	1.7246
C-3	15	47.8102	8.7835	27.367808	25.1105	8.630	11.33434	114.67767	1.8545
C-3	20	47.561	8.645	27.256336	25.0952	8.630	11.31224	114.0798	1.9448
C-3	25	47.238	8.4655	27.123245	25.0868	8.635	11.34	113.88154	1.9095
C-3	30	46.5442	8.0801	26.817268	25.0479	8.631	11.2529	111.97718	1.9543
C-3	35	45.6533	7.5852	26.634312	25.214	8.607	11.10872	109.38992	2.0315
C-3	40	44.7241	7.0689	26.464041	25.4121	8.571	10.90569	106.23037	1.9563
C-3	45	43.3377	6.2988	25.979778	25.4651	8.526	10.65344	101.92183	1.9997
C-3	50	41.1866	5.1036	25.508537	25.8587	8.458	9.97978	92.98403	1.9068
C-3	55	41.4018	5.2232	25.717609	25.9977	8.446	10.15128	94.95041	1.8554
C-3	60	41.4891	5.2717	25.815598	26.0682	8.448	10.24547	95.98917	1.9566
C-3	65	40.9685	4.9825	25.725245	26.1932	8.442	10.12139	94.23532	1.853
C-3	70	40.9035	4.9464	25.740582	26.2381	8.439	10.10244	94.00301	2.0109
C-3	75	40.8949	4.9416	25.738642	26.239	8.439	10.0957	93.92993	1.9515
C-3	80	40.7616	4.8676	25.70946	26.2641	8.437	10.0537	93.38455	1.9095
C-3	85	40.4992	4.7218	25.670491	26.335	8.429	9.97165	92.33399	1.9512
C-3	90	40.367	4.6484	25.652051	26.3719	8.421	9.94279	91.9222	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-3	95	40.3023	4.6124	25.641154	26.3876	8.419	9.94773	91.89572	1.9536
C-3	100	40.2133	4.563	25.625383	26.4085	8.414	9.9327	91.65748	1.8703
C-3	105	40.1439	4.5244	25.6169	26.4291	8.411	9.93152	91.57166	1.131
C-3a	5	49.6293	9.7941	27.91003	24.9455	XXXX	7.90887	81.63236	1.3432
C-3a	10	49.5198	9.7332	27.653832	24.7347	8.460	10.25322	105.7416	1.929
C-3a	15	49.3311	9.6284	27.727993	24.8796	8.614	10.34428	106.53615	1.8671
C-3a	20	48.7292	9.294	27.740206	25.124	8.625	10.26864	105.12199	1.909
C-3a	25	48.2655	9.0363	27.58866	25.1531	8.630	10.33027	105.15421	1.9544
C-3a	30	47.7208	8.7337	27.367079	25.1432	8.622	10.29857	104.10213	1.9536
C-3a	35	45.859	7.6994	26.756431	25.2594	8.541	9.80871	96.89403	1.8879
C-3a	40	45.2641	7.369	26.755094	25.4974	8.502	9.66157	94.83066	1.9523
C-3a	45	44.9256	7.1809	26.68676	25.5636	8.503	9.66484	94.4838	1.9904
C-3a	50	43.8007	6.5559	26.497961	25.8294	8.479	9.48235	91.49393	1.9543
C-3a	55	43.3032	6.2796	26.410303	25.9438	8.461	9.53984	91.50965	1.9886
C-3a	60	43.0778	6.1543	26.35539	25.9793	8.453	9.54876	91.34154	1.9536
C-3a	65	42.5411	5.8562	26.205505	26.0445	8.437	9.45403	89.82764	1.9536
C-3a	70	41.9849	5.5472	26.084961	26.1505	8.421	9.38936	88.60851	1.9536
C-3a	75	41.7352	5.4085	26.039569	26.2078	8.411	9.39479	88.39415	1.84
C-3a	80	41.6261	5.3478	26.014191	26.2265	8.407	9.40646	88.38414	1.9526
C-3a	85	41.5559	5.3088	25.998165	26.2386	8.402	9.41502	88.38761	1.9142
C-3a	90	41.5322	5.2956	25.992274	26.2417	8.400	9.4233	88.43873	1.9958
C-3a	95	41.5058	5.281	25.984741	26.2442	8.397	9.4292	88.46387	1.8768
C-3a	100	41.4521	5.2512	25.975482	26.2567	8.393	9.423	88.34853	1.9537
C-3a	105	41.4583	5.2546	25.976974	26.255	8.390	9.43663	88.48282	1.9536
C-3a	110	41.4601	5.2556	25.975987	26.2525	8.388	9.43961	88.5114	1.8679
C-3a	115	41.4472	5.2485	25.973461	26.2546	8.386	9.45282	88.62112	1.8841
C-3a	120	41.4368	5.2427	25.972962	26.258	8.384	9.46549	88.7293	2.0788
C-4	5	50.3368	10.1871	28.221276	24.9793	XXXX	6.31808	65.88729	1.13
C-4	10	50.1995	10.1108	28.079436	24.8928	8.670	9.50053	98.92565	1.9336
C-4	15	49.7174	9.843	27.918495	24.9189	8.523	9.32513	96.52956	1.9537
C-4	20	49.2699	9.5944	27.789561	24.9633	8.542	9.3589	96.3647	1.8667
C-4	25	48.2945	9.0525	27.512348	25.0653	8.533	9.31689	94.82317	1.9505
C-4	30	47.1586	8.4214	27.20385	25.2002	8.490	9.12498	91.61424	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-4	35	46.2622	7.9234	27.072156	25.4226	8.476	9.00691	89.5152	1.9536
C-4	40	45.7333	7.6296	26.944044	25.5035	8.483	9.03681	89.24594	1.9536
C-4	45	45.4892	7.494	26.907268	25.564	8.485	9.08101	89.43252	1.8766
C-4	50	45.2761	7.3756	26.856463	25.5975	8.482	9.07277	89.12274	1.9093
C-4	55	44.8938	7.1632	26.787724	25.6819	8.483	9.0287	88.29523	1.8706
C-4	60	44.688	7.0489	26.755652	25.7325	8.484	9.04192	88.21533	1.957
C-4	65	44.3839	6.8799	26.672792	25.7704	8.483	9.04913	87.95538	1.9536
C-4	70	43.757	6.5317	26.549342	25.9002	8.465	8.9308	86.16105	1.9127
C-4	75	43.5801	6.4334	26.510687	25.9326	8.459	8.9571	86.23048	1.9129
C-4	80	43.4926	6.3848	26.490261	25.9469	8.459	8.97345	86.29558	1.954
C-4	85	43.4615	6.3675	26.483595	25.9522	8.457	8.98364	86.36087	1.9122
C-4	90	43.4123	6.3402	26.467958	25.9556	8.454	8.98621	86.33098	1.9161
C-4	95	43.3752	6.3195	26.459791	25.9619	8.451	8.98752	86.30441	2.0217
C-4	100	43.3655	6.3142	26.458608	25.9641	8.448	8.99094	86.32741	1.9535
C-4	105	43.3489	6.3049	26.452173	25.9636	8.445	8.99438	86.34103	1.9183
C-4	110	43.3239	6.291	26.448131	25.9692	8.444	8.99733	86.34377	1.913
C-4	115	43.3204	6.2891	26.447385	25.9692	8.442	9.00276	86.39197	1.9532
C-4	120	43.3173	6.2874	26.447505	25.97	8.439	9.00677	86.42734	1.9906
C-4	125	43.3183	6.2879	26.448133	25.9697	8.437	9.01243	86.48258	1.8707
C-6	5	47.6228	8.6793	27.433637	25.2521	XXXX	7.10917	71.79403	1.233
C-6	10	47.4855	8.6031	27.371935	25.2434	8.575	9.48032	95.60615	1.9743
C-6	15	47.3465	8.5258	27.352496	25.2782	8.448	9.40708	94.71807	1.8789
C-6	20	47.513	8.6183	27.389486	25.2492	8.450	9.44604	95.2954	1.865
C-6	25	46.4953	8.0529	27.084404	25.3436	8.449	9.27138	92.39165	1.9874
C-6	30	45.1212	7.2896	26.854476	25.6614	8.407	9.01835	88.44586	1.91
C-6	35	44.9467	7.1926	26.824875	25.7016	8.407	9.10301	89.09521	1.9187
C-6	40	44.7223	7.068	26.778987	25.7453	8.411	9.10531	88.88106	1.8545
C-6	45	44.5801	6.989	26.749512	25.7725	8.416	9.11856	88.86007	1.8787
C-6	50	44.4326	6.907	26.720336	25.8023	8.418	9.10816	88.60369	1.9964
C-6	55	44.1941	6.7745	26.676909	25.8551	8.419	9.08679	88.14873	1.9163
C-6	60	44.0042	6.669	26.640162	25.8948	8.420	9.07143	87.80157	1.9129
C-6	65	43.7113	6.5063	26.581414	25.9545	8.417	9.04192	87.21125	1.9543
C-6	70	43.4734	6.3741	26.530015	25.9991	8.412	9.0061	86.61695	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-6	75	43.4272	6.3485	26.513998	26.0008	8.410	9.01255	86.6267	1.84
C-6	80	43.4139	6.341	26.509642	26.0011	8.413	9.0259	86.73979	1.8313
C-6	85	43.4026	6.3348	26.505789	26.0011	8.414	9.02633	86.73095	1.9151
C-6	90	43.3803	6.3224	26.500056	26.0037	8.413	9.02609	86.70446	1.9526
C-6	95	43.3535	6.3075	26.492684	26.0065	8.411	9.02435	86.65839	1.9164
C-6	100	43.3471	6.304	26.489941	26.0057	8.408	9.02882	86.69342	1.9535
C-6	105	43.3555	6.3086	26.492896	26.0047	8.406	9.03444	86.75656	1.8803
C-6	110	43.3542	6.3079	26.493007	26.0048	8.406	9.03739	86.78336	1.9542
C-6	115	43.348	6.3045	26.491729	26.0054	8.405	9.03749	86.77763	1.9156
C-6	120	43.3397	6.2998	26.489118	26.0055	8.404	9.04308	86.82165	1.9541
C-6	125	43.3382	6.299	26.489689	26.0061	8.401	9.04509	86.8396	1.8379
C-6	130	43.3375	6.2986	26.489812	26.006	8.398	9.05135	86.89878	1.9933
IC-5	5	49.0418	9.4677	27.843014	25.1058	4.581	7.89911	81.01087	1.3053
IC-5	10	48.7411	9.3006	27.544043	24.9249	8.726	10.58632	108.26068	2.0154
IC-5	15	48.2705	9.0392	27.402953	24.9659	8.625	10.49932	106.75391	1.9533
IC-5	20	47.6876	8.7153	27.179248	24.9675	8.62	10.43565	105.32442	1.9536
IC-5	25	46.8493	8.2496	27.023826	25.1395	8.609	10.26194	102.57721	1.9161
IC-5	30	46.5511	8.0839	27.07355	25.3085	8.609	10.20155	101.69306	1.9531
IC-5	35	46.4476	8.0265	27.111751	25.3888	8.618	10.17585	101.35405	1.9536
IC-5	40	46.1843	7.8802	27.066692	25.4479	8.619	10.09834	100.27846	1.9137
IC-5	45	45.748	7.6378	26.969143	25.5231	8.623	10.0054	98.84425	1.9532
IC-5	50	45.1569	7.3094	26.831896	25.6206	8.614	9.89182	97.03158	1.9536
IC-5	55	44.7347	7.0749	26.712293	25.668	8.599	9.82737	95.89921	1.9536
IC-5	60	43.9181	6.6212	26.541354	25.8252	8.578	9.6734	93.47928	1.9129
IC-5	65	43.5278	6.4043	26.447791	25.8881	8.555	9.65129	92.82226	1.9559
IC-5	70	43.3028	6.2793	26.401111	25.9322	8.544	9.62873	92.35485	1.9151
IC-5	75	43.0787	6.1548	26.338144	25.9584	8.537	9.6107	91.92291	1.9543
IC-5	80	42.8242	6.0135	26.290131	26.0138	8.527	9.57498	91.30263	1.9536
IC-6	5	48.0826	8.9348	27.529815	25.1678	8.554	10.2835	104.44667	1.9548
IC-6	10	46.8948	8.2749	27.258298	25.363	8.536	10.17065	101.87094	1.9094
IC-6	15	45.9482	7.749	27.023705	25.5018	8.519	10.13738	100.39378	1.9545
IC-6	20	44.9752	7.2085	26.789469	25.6543	8.491	9.98578	97.74255	1.9536
IC-6	25	43.9127	6.6182	26.48272	25.7695	8.462	9.79872	94.65559	1.9536

BW000328

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
IC-6	30	42.991	6.1061	26.32031	25.9818	8.431	9.62101	91.92661	1.9536
IC-6	35	42.8251	6.0139	26.28296	26.0112	8.432	9.65777	92.09212	1.9886
IC-6	40	42.6674	5.9263	26.239751	26.0308	8.433	9.65335	91.86759	1.9075
IC-6	45	42.1547	5.6415	26.107326	26.1052	8.429	9.579	90.57905	1.8482
IC-6	50	41.849	5.4717	26.046696	26.1696	8.425	9.55706	90.03683	1.9555
IC-6	55	41.7748	5.4305	26.041823	26.1957	8.427	9.5794	90.17225	1.8881
IC-6	60	41.7688	5.4271	26.040936	26.1967	8.432	9.58937	90.25935	1.9131
IC-6	65	41.7496	5.4165	26.03379	26.1964	8.431	9.59153	90.25614	1.954
IC-6	70	41.7388	5.4105	26.031743	26.1982	8.431	9.59698	90.29532	1.9536
IC-6	75	41.7213	5.4007	26.027835	26.2009	8.428	9.60625	90.36267	1.919
IC-6	80	41.7196	5.3998	26.026882	26.1999	8.428	9.6129	90.42254	1.9544
IC-6	85	41.6731	5.3739	26.016412	26.2079	8.427	9.60492	90.29547	1.8865
IC-6	90	41.6003	5.3335	26.000628	26.2214	8.423	9.60064	90.17422	1.9186
IC-6	95	41.515	5.2861	25.979723	26.2346	8.419	9.58883	89.96708	1.9536
IC-6	100	41.458	5.2544	25.966122	26.2437	8.416	9.59264	89.93865	1.884
IC-6	105	41.2299	5.1277	25.909307	26.2794	8.411	9.55912	89.36827	1.9185
IC-6	110	41.0967	5.0537	25.88586	26.3108	8.403	9.55732	89.20794	1.8827
IC-6	115	41.0941	5.0522	25.881567	26.3065	8.403	9.59077	89.51449	1.9958
IC-7	5	47.5514	8.6397	27.611227	25.4603	4.219	8.07269	81.42892	1.2151
IC-7	10	47.2272	8.4595	27.316601	25.2897	8.595	10.355	104.11305	1.9174
IC-7	15	47.1564	8.4202	27.300409	25.3008	8.57	10.32297	103.70229	1.9161
IC-7	20	46.9954	8.3308	27.243224	25.306	8.574	10.29139	103.17555	1.9129
IC-7	25	46.5407	8.0782	27.131501	25.3729	8.566	10.18623	101.56949	1.9532
IC-7	30	45.7834	7.6574	26.968937	25.5102	8.549	10.06095	99.42929	1.8716
IC-7	35	45.2427	7.3571	26.854053	25.6104	8.534	10.01019	98.29641	1.8488
IC-7	40	44.6334	7.0186	26.702995	25.7018	8.525	9.95044	96.99104	1.9145
IC-7	45	43.8339	6.5744	26.520838	25.8404	8.509	9.84415	95.03247	1.9881
IC-7	50	43.1018	6.1677	26.351768	25.9665	8.491	9.76306	93.41337	1.913
IC-7	55	42.5326	5.8515	26.204086	26.0477	8.477	9.7022	92.1772	1.9558
IC-7	60	41.8074	5.4486	26.029521	26.1674	8.456	9.61768	90.55591	1.9148
IC-7	65	41.4551	5.2528	25.974912	26.2592	8.44	9.58033	89.82875	1.9546
IC-7	70	41.4762	5.2645	25.972065	26.2462	8.437	9.61584	90.17986	1.9876
IC-7	75	41.4161	5.2311	25.959538	26.2579	8.437	9.61368	90.09301	1.9149

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
IC-7	80	41.3751	5.2084	25.949306	26.2637	8.435	9.61662	90.07391	1.8837
IC-7	85	41.3658	5.2032	25.945334	26.2627	8.433	9.61979	90.09161	1.916
IC-7	90	41.3238	5.1799	25.937881	26.2721	8.429	9.6215	90.06184	1.8773
IC-7	95	41.3127	5.1737	25.93605	26.2743	8.426	9.63327	90.15972	1.9209
IC-7	100	41.2866	5.1592	25.925236	26.273	8.419	9.63345	90.12873	1.9552
IC-7	105	41.2022	5.1123	25.909602	26.2918	8.414	9.62659	89.97237	1.9536
IC-7	110	41.1974	5.1096	25.908085	26.2916	8.408	9.64022	90.09369	1.8826
IC-7	115	41.2087	5.116	25.91281	26.2912	8.405	9.65017	90.20047	1.9717
C-12	5	51.4984	10.8324	28.617791	24.9218	8.524	9.64975	102.12141	1.9093
C-12	10	50.653	10.3627	28.201507	24.8391	8.526	9.52274	99.68449	1.8997
C-12	15	48.5439	9.1911	27.531601	24.9886	8.519	9.22304	94.12555	1.9046
C-12	20	46.8732	8.2629	27.163031	25.2734	8.503	9.11898	91.26053	1.9048
C-12	25	46.0168	7.7871	27.039941	25.4898	8.503	9.20522	91.23568	1.9092
C-12	30	45.2314	7.3508	26.876542	25.6393	8.483	9.12793	89.6374	1.9962
C-12	35	44.9116	7.1731	26.813377	25.7039	8.475	9.10798	89.10432	1.9108
C-12	40	44.7841	7.1023	26.780321	25.7211	8.471	9.11584	89.04214	1.9543
C-12	45	44.6504	7.028	26.755523	25.7497	8.474	9.11312	88.8761	1.8749
C-12	50	44.3333	6.8519	26.686988	25.8083	8.475	9.05904	88.01432	1.9076
C-12	55	44.1881	6.7712	26.658533	25.838	8.469	9.0582	87.85442	1.9531
C-12	60	43.8236	6.5687	26.588343	25.9152	8.466	8.99353	86.8518	1.9061
C-12	65	43.6066	6.4481	26.556597	25.972	8.456	8.96629	86.37141	1.8657
C-12	70	43.3778	6.321	26.492166	25.9988	8.45	8.93896	85.86226	1.9525
C-12	75	43.2019	6.2233	26.478972	26.0586	8.445	8.94137	85.71739	1.9536
C-12	80	43.1869	6.2149	26.479982	26.0654	8.442	8.95259	85.81171	1.9102
C-12	85	43.1852	6.214	26.481541	26.0672	8.442	8.95794	85.86204	1.9092
C-12	90	43.1845	6.2136	26.482009	26.0674	8.441	8.9675	85.95292	1.9527
C-12	95	43.1855	6.2142	26.483355	26.0678	8.44	8.97202	85.99762	1.9536
C-12	100	43.1916	6.2175	26.487792	26.0694	8.438	8.9784	86.06665	1.8667
C-12	105	43.1929	6.2183	26.488604	26.0691	8.436	8.98577	86.13863	1.9519
C-12	110	43.1831	6.2129	26.488087	26.0721	8.438	8.99748	86.24126	1.9536
C-13	5	47.9608	8.8671	27.411627	25.0967	8.553	10.51563	106.58902	1.9142
C-13	10	47.9731	8.8739	27.419403	25.0992	8.557	10.49819	106.43047	1.865
C-13	15	47.8745	8.8192	27.371979	25.0894	8.561	10.49932	106.30213	1.9986

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-13	20	46.8122	8.229	27.113341	25.2465	8.545	10.298	102.965	1.9525
C-13	25	46.0884	7.8269	27.035936	25.4566	8.515	10.02762	99.45875	1.9536
C-13	30	45.4888	7.4938	26.883212	25.5409	8.501	9.88148	97.30246	1.9931
C-13	35	44.6065	7.0036	26.72453	25.7365	8.482	9.67104	94.2557	1.955
C-13	40	43.7075	6.5042	26.535252	25.9097	8.46	9.45757	91.19123	1.999
C-13	45	42.8629	6.0349	26.349165	26.066	8.438	9.31611	88.9108	1.9098
C-13	50	42.4926	5.8292	26.261792	26.1285	8.43	9.29115	88.26995	1.954
C-13	55	42.1557	5.6421	26.148888	26.1491	8.431	9.28376	87.81395	1.9162
C-13	60	41.7942	5.4412	26.071647	26.2196	8.423	9.25626	87.16721	1.8734
C-13	65	41.7514	5.4174	26.061688	26.2266	8.422	9.27558	87.30236	1.9118
C-13	70	41.7242	5.4023	26.050518	26.2254	8.422	9.28411	87.34988	1.9548
C-13	75	41.694	5.3855	26.041187	26.2275	8.425	9.293	87.39902	1.9536
C-13	80	41.6862	5.3812	26.039161	26.228	8.423	9.3063	87.51516	1.9536
C-13	85	41.6905	5.3836	26.040714	26.2272	8.422	9.30951	87.55	1.9536
C-13	90	41.6778	5.3766	26.035125	26.2259	8.422	9.31332	87.57004	1.911
C-13	95	41.6739	5.3744	26.034964	26.2268	8.421	9.3204	87.63248	1.9546
C-13	100	41.6727	5.3737	26.035053	26.2268	8.419	9.32857	87.70788	1.9536
C-14	5	47.8712	8.8173	27.321481	25.0409	XXXX	7.56874	76.57487	1.1871
C-14	10	47.8447	8.8026	27.301305	25.0304	8.654	10.55331	106.76868	1.9273
C-14	15	47.6547	8.697	27.429695	25.2344	8.541	10.4228	105.32963	1.954
C-14	20	47.4323	8.5735	27.452051	25.3447	8.545	10.39954	104.87126	1.9989
C-14	25	46.843	8.2461	27.317087	25.442	8.534	10.26523	102.80303	2.029
C-14	30	46.2714	7.9286	27.16858	25.5192	8.515	10.08649	100.32062	1.7965
C-14	35	45.3005	7.3891	26.887675	25.6223	8.492	9.8762	97.06601	1.8412
C-14	40	44.476	6.9311	26.7109	25.7754	8.463	9.65803	93.98954	1.957
C-14	45	44.2457	6.8031	26.655475	25.8119	8.454	9.63737	93.52696	1.8827
C-14	50	44.052	6.6955	26.61033	25.8441	8.453	9.61384	93.07982	1.955
C-14	55	43.7668	6.5371	26.549005	25.8975	8.450	9.57153	92.35311	1.8772
C-14	60	43.6039	6.4466	26.516486	25.9306	8.445	9.54361	91.90471	1.9138
C-14	65	43.5933	6.4407	26.514221	25.932	8.448	9.55239	91.97715	1.9161
C-14	70	43.5975	6.4431	26.505403	25.9201	8.450	9.57113	92.15568	1.9955
C-14	75	43.4213	6.3452	26.474356	25.9605	8.447	9.54422	91.70589	1.9911
C-14	80	43.2035	6.2241	26.427484	26.0016	8.438	9.50345	91.07404	1.9534

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-14	85	43.0698	6.1499	26.40197	26.0301	8.430	9.49115	90.81098	1.8314
C-14	90	43	6.1111	26.385329	26.0412	8.428	9.48529	90.6769	1.9196
C-14	95	42.7175	5.9542	26.313948	26.0836	8.421	9.44254	89.95366	1.954
C-14	100	42.2684	5.7047	26.223642	26.1769	8.398	9.34628	88.55455	1.9117
C-14	105	42.1984	5.6658	26.214926	26.1969	8.391	9.36534	88.66324	1.955
C-14	110	42.166	5.6478	26.206746	26.2013	8.386	9.37345	88.70394	1.9119
C-14	115	42.1277	5.6265	26.200169	26.2099	8.381	9.38819	88.80275	1.9868
C-15	5	48.2149	9.0083	27.572255	25.1585	XXXX	7.518	76.36855	1.186
C-15	10	48.0947	8.9415	27.378324	25.0103	8.710	10.6987	108.57372	1.9713
C-15	15	47.9074	8.8374	27.282712	24.9866	8.613	10.62557	107.55457	1.9168
C-15	20	47.3439	8.5244	27.121892	25.0444	8.629	10.57835	106.34843	1.9517
C-15	25	46.7444	8.1913	26.969312	25.1251	8.621	10.50981	104.90587	1.9536
C-15	30	46.3422	7.9679	26.856462	25.1685	8.625	10.43845	103.68043	1.9536
C-15	35	46.0271	7.7928	26.812407	25.2486	8.626	10.42827	103.2111	1.9536
C-15	40	45.7916	7.662	26.791003	25.3206	8.620	10.36932	102.36178	1.8629
C-15	45	45.4656	7.4809	26.710712	25.3683	8.618	10.30482	101.3263	1.9543
C-15	50	45.3167	7.3981	26.73656	25.4553	8.607	10.27129	100.85638	1.8723
C-15	55	44.3102	6.839	26.519256	25.6399	8.580	10.00537	97.10391	1.9544
C-15	60	41.9637	5.5354	26.007628	26.076	8.497	9.51724	89.74861	1.9164
C-15	65	40.7663	4.8702	25.750494	26.3101	8.460	9.48132	88.10013	1.8838
C-15	70	40.3024	4.6124	25.658357	26.4102	8.446	9.50112	87.78312	1.9543
C-15	75	40.2602	4.589	25.648996	26.4177	8.441	9.54439	88.13627	1.9536
C-15	80	40.2335	4.5741	25.643931	26.4232	8.438	9.5554	88.20878	1.8718
C-15	85	40.2286	4.5714	25.64351	26.4242	8.436	9.56686	88.30925	1.9539
C-15	90	40.2206	4.567	25.643259	26.4268	8.436	9.57336	88.36114	1.9148
C-15	95	40.1968	4.5537	25.641092	26.4343	8.433	9.5728	88.33137	1.8833
C-15	100	40.1774	4.543	25.640335	26.4414	8.431	9.57938	88.37264	1.9164
C-15	105	40.1481	4.5267	25.633782	26.4463	8.430	9.58048	88.35007	1.9188
C-15	110	40.1108	4.506	25.624948	26.4522	8.427	9.57665	88.27297	1.9187
C-15	115	40.106	4.5034	25.626108	26.455	8.423	9.5916	88.4066	1.8834
C-15	120	40.1003	4.5002	25.624317	26.4548	8.420	9.60031	88.47993	1.9799
C-15	5	48.2149	9.0083	27.572255	25.1585	XXXX	7.518	76.36855	1.186
C-15	10	48.0947	8.9415	27.378324	25.0103	8.710	10.6987	108.57372	1.9713

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-15	15	47.9074	8.8374	27.282712	24.9866	8.613	10.62557	107.55457	1.9168
C-15	20	47.3439	8.5244	27.121892	25.0444	8.629	10.57835	106.34843	1.9517
C-15	25	46.7444	8.1913	26.969312	25.1251	8.621	10.50981	104.90587	1.9536
C-15	30	46.3422	7.9679	26.856462	25.1685	8.625	10.43845	103.68043	1.9536
C-15	35	46.0271	7.7928	26.812407	25.2486	8.626	10.42827	103.2111	1.9536
C-15	40	45.7916	7.662	26.791003	25.3206	8.620	10.36932	102.36178	1.8629
C-15	45	45.4656	7.4809	26.710712	25.3683	8.618	10.30482	101.3263	1.9543
C-15	50	45.3167	7.3981	26.73656	25.4553	8.607	10.27129	100.85638	1.8723
C-15	55	44.3102	6.839	26.519256	25.6399	8.580	10.00537	97.10391	1.9544
C-15	60	41.9637	5.5354	26.007628	26.076	8.497	9.51724	89.74861	1.9164
C-15	65	40.7663	4.8702	25.750494	26.3101	8.460	9.48132	88.10013	1.8838
C-15	70	40.3024	4.6124	25.658357	26.4102	8.446	9.50112	87.78312	1.9543
C-15	75	40.2602	4.589	25.648996	26.4177	8.441	9.54439	88.13627	1.9536
C-15	80	40.2335	4.5741	25.643931	26.4232	8.438	9.5554	88.20878	1.8718
C-15	85	40.2286	4.5714	25.64351	26.4242	8.436	9.56686	88.30925	1.9539
C-15	90	40.2206	4.567	25.643259	26.4268	8.436	9.57336	88.36114	1.9148
C-15	95	40.1968	4.5537	25.641092	26.4343	8.433	9.5728	88.33137	1.8833
C-15	100	40.1774	4.543	25.640335	26.4414	8.431	9.57938	88.37264	1.9164
C-15	105	40.1481	4.5267	25.633782	26.4463	8.430	9.58048	88.35007	1.9188
C-15	110	40.1108	4.506	25.624948	26.4522	8.427	9.57665	88.27297	1.9187
C-15	115	40.106	4.5034	25.626108	26.455	8.423	9.5916	88.4066	1.8834
C-15	120	40.1003	4.5002	25.624317	26.4548	8.420	9.60031	88.47993	1.9799
C-16	5	48.0199	8.9	27.5031	25.1657	XXXX	7.28457	73.79941	1.1971
C-16	10	47.8838	8.8243	27.221514	24.9347	8.481	10.26947	103.88035	1.8627
C-16	15	47.3687	8.5382	27.105795	25.0187	8.612	10.3369	103.93655	1.9168
C-16	20	47.3488	8.5271	27.143732	25.0646	8.627	10.45004	105.0783	1.916
C-16	25	46.8869	8.2705	27.059478	25.1607	8.621	10.31977	103.21917	1.8473
C-16	30	46.4638	8.0354	26.9373	25.2033	8.635	10.317	102.65823	1.9117
C-16	35	45.9663	7.7591	26.839243	25.301	8.635	10.31713	102.06495	1.9538
C-16	40	45.8635	7.702	26.905134	25.4102	8.626	10.26741	101.50915	1.9163
C-16	45	45.3643	7.4246	26.777104	25.479	8.617	10.16792	99.91962	1.8506
C-16	50	45.082	7.2678	26.722575	25.5365	8.607	10.13132	99.22945	1.953
C-16	55	44.4624	6.9236	26.613964	25.6773	8.593	10.06776	97.9028	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-16	60	42.689	5.9384	26.272979	26.0553	8.534	9.66048	91.9759	1.9151
C-16	65	41.8087	5.4493	26.053246	26.1925	8.504	9.61702	90.56778	1.9188
C-16	70	40.764	4.8689	25.790509	26.3553	8.476	9.47875	88.10009	1.848
C-16	75	40.3494	4.6386	25.687683	26.4219	8.462	9.47498	87.60496	1.9176
C-16	80	40.1864	4.548	25.647185	26.4477	8.456	9.48881	87.55169	1.916
C-16	85	40.1102	4.5057	25.627363	26.4585	8.455	9.48931	87.4708	1.9521
C-16	90	40.0645	4.4803	25.613711	26.4627	8.453	9.49268	87.44937	1.9536
C-16	95	39.9814	4.4341	25.598573	26.4818	8.452	9.48975	87.33345	1.8789
C-16	100	39.9853	4.4363	25.597331	26.478	8.450	9.49258	87.36194	1.9133
C-16	105	39.9703	4.428	25.593677	26.4799	8.448	9.48964	87.31795	1.8837
C-16	110	39.9676	4.4265	25.595193	26.4821	8.447	9.49547	87.36975	1.9134
C-16	115	39.9637	4.4243	25.593992	26.4819	8.442	9.50627	87.46422	1.9535
C-16	120	39.9558	4.4199	25.592508	26.4831	8.436	9.51169	87.50514	1.8811
C-16	125	39.945	4.4139	25.59265	26.4874	8.435	9.52512	87.61818	2.0036
C-17	5	46.787	8.215	27.495122	25.6511	3.389	7.08566	70.66262	1.1059
C-17	10	46.4399	8.0222	26.940587	25.2188	8.682	10.53299	104.80035	1.9732
C-17	15	46.318	7.9544	27.128048	25.4601	8.568	10.37597	103.22143	1.9536
C-17	20	46.2164	7.898	27.119073	25.4914	8.576	10.26407	101.9956	1.9169
C-17	25	45.5601	7.5334	26.899383	25.5291	8.574	10.10873	99.6247	1.8848
C-17	30	44.4811	6.934	26.693206	25.7558	8.56	9.89811	96.32174	1.9893
C-17	35	43.952	6.64	26.538405	25.8109	8.547	9.87043	95.4224	1.9189
C-17	40	41.7037	5.3909	25.955563	26.1333	8.503	9.42531	88.60641	1.9128
C-17	45	40.6143	4.7857	25.777313	26.4096	8.481	9.38122	87.04495	1.9213
C-17	50	40.4513	4.6952	25.748792	26.449	8.483	9.49523	87.93067	1.921
C-17	55	40.3818	4.6566	25.732858	26.4612	8.481	9.52179	88.09979	1.8833
C-17	60	40.3687	4.6493	25.728967	26.4619	8.481	9.54946	88.34038	1.9195
C-17	65	40.3558	4.6421	25.723705	26.4611	8.478	9.5602	88.42354	1.8547
C-17	70	40.3118	4.6177	25.706821	26.4608	8.475	9.56891	88.45059	1.9545
C-17	75	40.2124	4.5625	25.6816	26.4758	8.468	9.56431	88.29621	1.9215
C-17	80	40.1315	4.5175	25.666939	26.4945	8.461	9.56817	88.24452	1.8846
C-17	85	40.0714	4.4841	25.648383	26.4996	8.454	9.55864	88.08679	1.9205
C-17	90	40.0265	4.4591	25.63684	26.5059	8.448	9.56756	88.11817	1.8838
C-17	95	39.9568	4.4204	25.6174	26.5142	8.445	9.56313	87.99775	2.0166

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-17	100	39.9343	4.4079	25.610657	26.5159	8.438	9.57383	88.06996	1.8841
C-17	105	39.9244	4.4025	25.608644	26.5174	8.433	9.5831	88.14409	1.8558
C-17	110	39.9246	4.4026	25.608246	26.5161	8.427	9.59312	88.23585	1.9195
C-17	115	39.9252	4.4029	25.610556	26.5179	8.42	9.60974	88.39039	1.9775
C-19	5	51.8573	11.0318	29.135599	25.2772	XXXX	6.59434	69.63955	0.9825
C-19	10	49.4337	9.6854	27.919431	25.0289	8.440	10.91001	112.60886	1.8348
C-19	15	46.1214	7.8452	26.956124	25.3612	8.588	10.74304	106.52452	1.952
C-19	20	43.4631	6.3684	26.190254	25.644	8.574	10.7611	103.24053	1.9536
C-19	25	43.1374	6.1875	26.21997	25.8117	8.561	11.1881	106.99187	1.9062
C-19	30	43.1081	6.1712	26.196097	25.7976	8.529	11.1737	106.80402	1.8994
C-19	35	42.7026	5.9459	26.090781	25.8541	8.509	10.90205	103.6797	1.905
C-19	40	42.5839	5.8799	26.079964	25.8922	8.493	10.77746	102.3575	1.9048
C-19	45	42.4306	5.7947	26.076309	25.9529	8.478	10.63072	100.79649	1.9093
C-19	50	42.1227	5.6237	26.01324	26.0148	8.470	10.46039	98.81206	1.9047
C-19	55	40.9837	4.9909	25.801329	26.2732	8.461	10.17654	94.8212	1.8628
C-19	60	40.1884	4.5491	25.665768	26.4705	8.449	10.08028	93.02527	1.9551
C-19	65	39.8331	4.3517	25.59706	26.5503	8.435	10.07481	92.57051	1.8567
C-19	70	39.6548	4.2527	25.566236	26.5943	8.428	10.07277	92.35112	1.9044
C-19	75	39.5606	4.2003	25.55684	26.6252	8.423	10.07259	92.24818	1.9523
C-19	80	39.547	4.1928	25.554511	26.628	8.422	10.08222	92.32074	1.856
C-19	85	39.5119	4.1732	25.549281	26.6372	8.416	10.07253	92.19276	2.0014
C-21	5	47.5433	8.6352	27.290108	25.1381	XXXX			0.6849
C-21	10	47.5244	8.6246	27.269577	25.1242	8.088	9.897	99.779	1.8014
C-21	15	47.5763	8.6535	27.430189	25.2659	8.555	10.274	103.741	1.9539
C-21	20	47.6258	8.681	27.471859	25.288	8.561	10.21	103.178	1.9536
C-21	25	47.5491	8.6384	27.49254	25.3388	8.568	10.169	102.698	1.9844
C-21	30	47.3151	8.5084	27.450858	25.3891	8.570	10.108	101.804	1.953
C-21	35	46.6432	8.1351	27.280766	25.4841	8.563	9.995	99.871	1.9229
C-21	40	45.2307	7.3504	26.904968	25.6683	8.534	9.694	95.22	1.9159
C-21	45	43.8811	6.6006	26.579989	25.8843	8.501	9.404	90.868	1.923
C-21	50	43.242	6.2455	26.457198	26.021	8.466	9.308	89.26	1.954
C-21	55	43.2003	6.2224	26.443082	26.0228	8.455	9.321	89.331	1.9183
C-21	60	43.1596	6.1998	26.427958	26.0232	8.455	9.308	89.162	1.8834

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-21	65	43.1085	6.1714	26.419653	26.0353	8.455	9.296	88.992	1.9546
C-21	70	43.0805	6.1558	26.413448	26.0399	8.455	9.287	88.877	1.8864
C-21	75	43.066	6.1478	26.412203	26.0441	8.454	9.29	88.891	1.8885
C-21	80	43.0619	6.1455	26.412016	26.045	8.454	9.295	88.934	1.954
C-21	85	43.0583	6.1435	26.412271	26.0462	8.454	9.291	88.891	1.9191
C-21	90	43.0547	6.1415	26.413052	26.0479	8.450	9.297	88.947	1.8717
C-22	5	49.0343	9.4635	27.954815	25.2201	XXXXX	7.36424	75.54389	1.2701
C-22	10	48.8915	9.3842	27.622993	24.9452	8.604	10.16681	104.17605	2.0591
C-22	15	47.9717	8.8732	27.340615	25.0199	8.607	10.07515	102.08774	1.9881
C-22	20	47.6414	8.6896	27.455922	25.2656	8.601	10.1173	102.2457	1.9163
C-22	25	47.4786	8.5993	27.428941	25.3023	8.602	10.07917	101.67296	1.953
C-22	30	46.6585	8.1436	27.195513	25.391	8.587	9.85888	98.47245	1.9202
C-22	35	45.0634	7.2575	26.827627	25.6566	8.535	9.52427	93.33998	1.921
C-22	40	43.6961	6.4979	26.547595	25.9277	8.476	9.18274	88.53593	1.921
C-22	45	43.395	6.3305	26.521857	26.0266	8.471	9.20855	88.48755	1.9533
C-22	50	43.3453	6.3029	26.517445	26.0423	8.474	9.20135	88.36899	1.9181
C-22	55	43.3227	6.2904	26.516454	26.0502	8.477	9.19468	88.28293	1.9525
C-22	60	43.314	6.2856	26.51616	26.0529	8.481	9.18955	88.22506	1.9536
C-22	65	43.3076	6.282	26.517565	26.0566	8.484	9.19401	88.26241	1.9536
C-22	70	43.3	6.2778	26.517209	26.0588	8.485	9.19395	88.25425	1.9536
C-22	75	43.2956	6.2753	26.516504	26.0593	8.485	9.20216	88.32818	1.9182
C-22	80	43.2858	6.2699	26.516047	26.0624	8.485	9.21326	88.42488	1.9544
C-22	85	43.2828	6.2682	26.516062	26.063	8.483	9.21857	88.47274	1.9188
C-22	90	43.2826	6.2681	26.516178	26.0626	8.480	9.22913	88.5736	1.9524
C-22	95	43.2762	6.2645	26.514555	26.063	8.478	9.23675	88.63931	1.8761
C-22	100	43.2734	6.263	26.513208	26.0621	8.475	9.24144	88.68066	1.9074
C-22	5	49.0343	9.4635	27.954815	25.2201	XXXXX	7.36424	75.54389	1.2701
C-22	10	48.8915	9.3842	27.622993	24.9452	8.604	10.16681	104.17605	2.0591
C-22	15	47.9717	8.8732	27.340615	25.0199	8.607	10.07515	102.08774	1.9881
C-22	20	47.6414	8.6896	27.455922	25.2656	8.601	10.1173	102.2457	1.9163
C-22	25	47.4786	8.5993	27.428941	25.3023	8.602	10.07917	101.67296	1.953
C-22	30	46.6585	8.1436	27.195513	25.391	8.587	9.85888	98.47245	1.9202
C-22	35	45.0634	7.2575	26.827627	25.6566	8.535	9.52427	93.33998	1.921

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-22	40	43.6961	6.4979	26.547595	25.9277	8.476	9.18274	88.53593	1.921
C-22	45	43.395	6.3305	26.521857	26.0266	8.471	9.20855	88.48755	1.9533
C-22	50	43.3453	6.3029	26.517445	26.0423	8.474	9.20135	88.36899	1.9181
C-22	55	43.3227	6.2904	26.516454	26.0502	8.477	9.19468	88.28293	1.9525
C-22	60	43.314	6.2856	26.51616	26.0529	8.481	9.18955	88.22506	1.9536
C-22	65	43.3076	6.282	26.517565	26.0566	8.484	9.19401	88.26241	1.9536
C-22	70	43.3	6.2778	26.517209	26.0588	8.485	9.19395	88.25425	1.9536
C-22	75	43.2956	6.2753	26.516504	26.0593	8.485	9.20216	88.32818	1.9182
C-22	80	43.2858	6.2699	26.516047	26.0624	8.485	9.21326	88.42488	1.9544
C-22	85	43.2828	6.2682	26.516062	26.063	8.483	9.21857	88.47274	1.9188
C-22	90	43.2826	6.2681	26.516178	26.0626	8.480	9.22913	88.5736	1.9524
C-22	95	43.2762	6.2645	26.514555	26.063	8.478	9.23675	88.63931	1.8761
C-22	100	43.2734	6.263	26.513208	26.0621	8.475	9.24144	88.68066	1.9074
C-23	5	49.3317	9.6287	28.263188	25.4092	XXXX	6.71783	69.27429	1.1349
C-23	10	48.9536	9.4187	27.938575	25.2349	8.616	9.79635	100.64841	1.9652
C-23	15	47.8082	8.7823	27.489443	25.2341	8.554	9.62779	97.48891	1.9536
C-23	20	47.3532	8.5296	27.368329	25.2911	8.558	9.69319	97.61522	1.9104
C-23	25	47.3067	8.5038	27.375906	25.3167	8.569	9.76632	98.30952	1.8638
C-23	30	46.8714	8.2619	27.272637	25.3847	8.576	9.6789	96.9335	1.914
C-23	35	45.2626	7.3681	26.947968	25.7013	8.550	9.28817	91.28757	1.9539
C-23	40	44.8137	7.1188	26.912418	25.8484	8.509	9.15053	89.48911	1.816
C-23	45	44.1981	6.7767	26.76326	25.9468	8.487	9.03092	87.66435	1.9556
C-23	50	44.0752	6.7085	26.751124	25.9847	8.481	9.01635	87.40173	1.914
C-23	55	44.041	6.6895	26.745721	25.9928	8.483	9.03163	87.5148	1.8636
C-23	60	44.0443	6.6913	26.745598	25.9906	8.484	9.03693	87.56873	1.9555
C-23	65	44.0361	6.6867	26.745527	25.9934	8.485	9.0409	87.59931	1.9125
C-23	70	44.0383	6.6879	26.745829	25.9922	8.483	9.04637	87.65412	1.8729
C-23	75	44.0371	6.6873	26.745751	25.992	8.481	9.04804	87.66886	1.8722
C-23	80	44.0285	6.6825	26.745781	25.995	8.483	9.05702	87.7477	1.9995
C-23	85	44.0288	6.6827	26.746232	25.9948	8.480	9.06103	87.78666	1.8715
C-23	90	44.0328	6.6849	26.747702	25.9941	8.478	9.06642	87.84308	1.9938
C-23	95	44.0386	6.6881	26.748589	25.992	8.477	9.06847	87.86853	1.9442
C-24	5	49.1393	9.5218	28.080884	25.3042	8.564	9.80829	101.04566	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-24	10	49.071	9.4839	28.021759	25.2717	8.566	9.80203	100.87359	1.9536
C-24	15	48.6392	9.244	27.85382	25.273	8.572	9.73218	99.61182	1.9085
C-24	20	48.4593	9.1441	27.808516	25.2979	8.578	9.76298	99.71603	1.8639
C-24	25	48.4227	9.1237	27.796579	25.2998	8.584	9.79546	100.00267	1.9988
C-24	30	48.3824	9.1013	27.783967	25.3025	8.596	9.79773	99.97652	1.9533
C-24	35	48.3581	9.0879	27.77725	25.3047	8.606	9.79998	99.97022	1.9536
C-24	40	48.3001	9.0556	27.750487	25.3002	8.618	9.79842	99.8779	1.9536
C-24	45	48.2008	9.0005	27.716072	25.3042	8.626	9.79862	99.7568	1.9158
C-24	50	48.0205	8.9003	27.659623	25.318	8.629	9.78885	99.43875	1.913
C-24	55	47.1235	8.4019	27.435199	25.4471	8.602	9.58066	96.29916	1.8738
C-24	60	45.8333	7.6852	27.136922	25.6613	8.556	9.28914	91.95359	1.9529
C-24	65	44.6049	7.0028	26.885967	25.9045	8.509	9.0488	88.28459	1.9075
C-24	70	44.3736	6.8742	26.858721	25.9717	8.496	9.09305	88.48526	1.9092
C-24	75	44.3635	6.8686	26.851654	25.9678	8.495	9.1178	88.7121	1.8714
C-24	80	44.3605	6.8669	26.85048	25.9672	8.494	9.12501	88.77833	1.9545
C-24	85	44.342	6.8567	26.849221	25.973	8.493	9.12189	88.72983	1.9141
C-24	90	44.3377	6.8542	26.848072	25.973	8.492	9.12566	88.76135	1.9092
C-24	95	44.3395	6.8552	26.847919	25.9715	8.488	9.12314	88.73804	1.8606
C-25	5	49.563	9.7572	28.495886	25.549	3.318	5.35974	55.51043	1.1041
C-25	10	49.518	9.7322	28.251624	25.3247	8.539	9.60412	99.4266	1.9545
C-25	15	49.2118	9.5621	28.14657	25.3399	8.539	9.55407	98.53872	1.9056
C-25	20	48.9587	9.4215	28.091424	25.3838	8.537	9.56356	98.35086	1.955
C-25	25	48.8211	9.3451	28.06646	25.4126	8.535	9.56675	98.23119	1.9975
C-25	30	48.5513	9.1951	27.965473	25.4177	8.536	9.52973	97.52244	1.9535
C-25	35	48.0526	8.9181	27.856146	25.5051	8.528	9.38618	95.50107	1.8627
C-25	40	47.4685	8.5936	27.716853	25.5971	8.515	9.30053	93.98437	1.8554
C-25	45	46.7669	8.2039	27.586042	25.7465	8.497	9.18137	92.03719	1.9143
C-25	50	46.2443	7.9135	27.455677	25.8249	8.488	9.13208	90.97521	1.9045
C-25	55	45.8591	7.6995	27.401612	25.9266	8.478	9.11015	90.36353	1.8717
C-25	60	45.7406	7.6337	27.382156	25.9548	8.477	9.143	90.56644	1.856
C-25	65	45.6991	7.6106	27.372657	25.9614	8.475	9.1668	90.75721	1.9129
C-25	70	45.6734	7.5963	27.366048	25.9646	8.473	9.18043	90.86371	1.9048
C-25	75	45.651	7.5839	27.361724	25.9687	8.472	9.18658	90.9005	1.9539

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-25	80	45.6454	7.5807	27.357975	25.9666	8.471	9.18926	90.91911	1.9536
C-25	85	45.6347	7.5748	27.355381	25.9677	8.469	9.19524	90.96627	1.9536
C-25	90	45.6186	7.5659	27.353147	25.9714	8.466	9.20049	91.00144	1.9105
C-25	95	45.6226	7.5681	27.353098	25.9691	8.463	9.20816	91.08065	1.9527
C-25	100	45.6239	7.5689	27.350694	25.9654	8.465	9.19797	90.97929	1.9536
C-26	5	49.1145	9.508	28.406462	25.6376	XXXX	6.81967	70.17772	1.193
C-26	10	49.0267	9.4593	28.013684	25.281	8.386	9.58212	98.55304	1.9759
C-26	15	48.8495	9.3608	27.94764	25.2841	8.521	9.62196	98.75252	1.9151
C-26	20	48.8035	9.3353	27.936227	25.2902	8.526	9.62936	98.77508	1.9093
C-26	25	48.7944	9.3302	27.933414	25.2904	8.534	9.63867	98.85932	1.952
C-26	30	48.79	9.3278	27.947501	25.3057	8.544	9.63535	98.82944	1.8662
C-26	35	48.77	9.3167	27.976712	25.3421	8.558	9.63328	98.80626	1.9541
C-26	40	48.4977	9.1654	27.959091	25.4314	8.567	9.61104	98.29583	1.9536
C-26	45	47.9002	8.8334	27.828554	25.5369	8.560	9.5134	96.62845	2.031
C-26	50	46.4301	8.0167	27.400274	25.6925	8.540	9.25263	92.3314	1.9067
C-26	55	45.1976	7.332	27.196817	25.9865	8.495	9.13914	89.90734	1.8708
C-26	60	45.1654	7.3141	27.18275	25.9847	8.484	9.24025	90.86418	1.9098
C-26	65	45.1338	7.2966	27.167047	25.9807	8.484	9.26844	91.10141	1.913
C-26	70	45.1085	7.2825	27.157295	25.9804	8.485	9.27999	91.1846	1.9129
C-26	75	45.0842	7.269	27.147534	25.9797	8.483	9.27786	91.13431	1.9543
C-26	80	45.0789	7.266	27.146633	25.9803	8.480	9.28233	91.17231	1.9536
C-26	85	45.0771	7.2651	27.146132	25.98	8.480	9.2883	91.22852	1.8661
C-26	90	45.0736	7.2631	27.147149	25.9819	8.479	9.28994	91.2416	1.9697
C-27	5	49.888	9.9378	28.218911	25.1493	8.562	9.74184	101.20788	1.9129
C-27	10	49.1731	9.5406	28.009464	25.2197	8.573	9.66332	99.54067	1.9092
C-27	15	49.0984	9.4991	28.015083	25.2538	8.58	9.77638	100.63271	1.9532
C-27	20	49.0198	9.4554	28.013128	25.282	8.593	9.81999	100.99999	1.863
C-27	25	48.9428	9.4126	27.992038	25.2907	8.602	9.84476	101.16221	1.8786
C-27	30	48.3881	9.1045	27.827837	25.3442	8.613	9.7671	99.69789	1.9123
C-27	35	48.0307	8.906	27.77011	25.427	8.616	9.78655	99.4972	1.9129
C-27	40	47.5848	8.6582	27.554297	25.3853	8.611	9.69083	97.94243	1.9129
C-27	45	46.0447	7.8026	27.283815	25.7292	8.563	9.30359	92.38958	1.916
C-27	50	44.9354	7.1863	26.982777	25.8711	8.527	9.14248	89.56913	1.873

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
C-27	55	44.396	6.8867	26.862197	25.9678	8.512	9.11366	88.70964	1.9135
C-27	60	44.354	6.8633	26.843279	25.9647	8.51	9.14645	88.97789	1.9545
C-27	65	44.3309	6.8505	26.838766	25.969	8.51	9.1617	89.10165	1.9158
C-27	70	44.312	6.84	26.835679	25.973	8.509	9.16695	89.13286	1.9533
C-27	75	44.3018	6.8344	26.834502	25.9754	8.504	9.18176	89.26626	1.9536
C-27	80	44.3055	6.8364	26.834081	25.9728	8.5	9.18833	89.33293	1.834
C-27	85	44.3026	6.8348	26.833274	25.9726	8.497	9.19781	89.42161	1.9555
C-27	90	44.3047	6.8359	26.834621	25.9725	8.493	9.20571	89.50083	1.8899
C-28	5	49.1512	9.5284	27.942108	25.1619	8.516	9.58926	98.71458	1.9932
C-28	10	48.8538	9.3632	27.844265	25.1801	8.521	9.57094	98.16906	1.9536
C-28	15	48.6759	9.2644	27.795111	25.2001	8.524	9.55916	97.84083	1.9939
C-28	20	48.6162	9.2312	27.809333	25.2371	8.528	9.57534	97.95569	1.9085
C-28	25	48.4851	9.1584	27.868697	25.3474	8.532	9.61348	98.25215	1.9538
C-28	30	48.3098	9.061	27.844487	25.3918	8.543	9.6636	98.57336	1.8746
C-28	35	47.9359	8.8533	27.750743	25.4452	8.543	9.65612	98.06463	1.9145
C-28	40	47.6435	8.6908	27.760111	25.5708	8.528	9.56321	96.83783	1.9092
C-28	45	47.2048	8.4471	27.70317	25.6889	8.502	9.51022	95.83553	1.955
C-28	50	46.3091	7.9495	27.452255	25.7948	8.49	9.37757	93.48146	1.9155
C-28	55	45.2643	7.369	27.194663	25.9567	8.468	9.22065	90.77284	1.916
C-28	60	45.0564	7.2535	27.140331	25.9855	8.458	9.264	90.96839	1.9526
C-28	65	45.0146	7.2303	27.124852	25.986	8.455	9.29843	91.25695	1.8727
C-28	70	45.0027	7.2237	27.119803	25.985	8.456	9.31256	91.38086	1.9131
C-28	75	44.9952	7.2196	27.119165	25.9869	8.455	9.32414	91.48655	1.9161
C-28	80	44.9992	7.2218	27.11887	25.9843	8.452	9.33063	91.5536	1.9532
C-28	85	45.0006	7.2226	27.120412	25.9847	8.451	9.3358	91.60625	1.914
C-28	90	44.994	7.2189	27.120849	25.9873	8.448	9.34075	91.64835	1.9534
C-28	95	45.0128	7.2294	27.121065	25.9791	8.445	9.33669	91.62622	1.9536
MG-1	5	49.3311	9.6284	27.944595	25.0944	7.356	10.26646	105.81724	1.77
MG-1	10	48.9823	9.4346	27.762176	25.0486	8.489	9.54635	97.99243	1.9528
MG-1	15	48.1943	8.9969	27.500149	25.0932	8.493	9.46413	96.2122	1.9536
MG-1	20	46.9668	8.3149	27.093538	25.1652	8.459	9.15217	91.63934	1.9536
MG-1	25	45.5307	7.517	26.827896	25.4676	8.428	9.04187	89.04309	1.9536
MG-1	30	44.6506	7.0281	26.727147	25.7215	8.417	8.92867	87.06131	1.9536

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
MG-1	35	44.5381	6.9656	26.708576	25.7478	8.418	8.96047	87.25715	1.9168
MG-1	40	44.4058	6.8921	26.680781	25.7727	8.424	8.98117	87.32064	1.9547
MG-1	45	44.1353	6.7418	26.639531	25.841	8.425	8.96107	86.8535	1.9092
MG-1	50	43.943	6.635	26.607988	25.8873	8.426	8.95208	86.57217	1.8547
MG-1	55	43.8413	6.5785	26.599733	25.9206	8.427	8.96319	86.58178	1.9543
MG-1	60	43.8255	6.5697	26.59817	25.9249	8.43	8.97633	86.69307	1.8995
MG-1	65	43.8158	6.5643	26.593832	25.9238	8.431	8.98373	86.7527	1.9537
MG-1	70	43.8025	6.557	26.591432	25.9262	8.433	8.98768	86.77685	1.8995
MG-1	75	43.8052	6.5585	26.593638	25.9267	8.434	8.99788	86.87888	1.7876
MG-3	5	49.1529	9.5294	27.869646	25.0896	1.176	4.96442	51.10358	0.7517
MG-3	10	49.6414	9.8007	27.887719	24.9183	8.655	9.75975	100.9265	1.9397
MG-3	15	49.1515	9.5286	27.742553	24.963	8.489	9.53097	97.9906	1.955
MG-3	20	48.8876	9.382	27.67744	24.9999	8.493	9.50796	97.4525	1.9994
MG-3	25	48.6861	9.2701	27.628511	25.0288	8.498	9.501	97.15169	1.9114
MG-3	30	48.7726	9.3181	27.649192	25.0153	8.503	9.56441	97.8987	1.9542
MG-3	35	48.5693	9.2052	27.587497	25.0322	8.51	9.51803	97.18462	1.9124
MG-3	40	48.3867	9.1037	27.538364	25.0536	8.517	9.51213	96.91332	1.9091
MG-3	45	48.3764	9.098	27.532166	25.0508	8.522	9.54839	97.26824	1.8723
MG-3	50	48.0689	8.9271	27.434906	25.0728	8.523	9.48233	96.23263	1.9098
MG-3	55	47.3371	8.5206	27.219794	25.1426	8.516	9.34416	93.99247	1.8781
MG-3	60	46.0054	7.7808	26.754321	25.1952	8.488	9.07074	89.72635	1.9719
MG-5	5	47.89	8.8278	27.544565	25.2583	8.638	11.15813	113.11674	1.9536
MG-5	10								
MG-5	15	47.898	8.8322	27.517422	25.2269	8.634	11.18538	113.38167	1.9536
MG-5	20	47.7947	8.7749	27.454031	25.2031	8.635	11.21412	113.50639	1.883
MG-5	25	46.8255	8.2364	27.141263	25.2692	8.627	11.02718	110.28754	1.9141
MG-5	30	46.6377	8.132	27.150871	25.3533	8.621	11.11246	110.92911	1.9533
MG-5	35	46.5764	8.098	27.100825	25.3259	8.627	11.16626	111.35841	1.9536
MG-5	40	46.4913	8.0507	27.08624	25.3444	8.627	11.1709	111.2957	1.8715
MG-5	45	46.5118	8.0621	27.095052	25.3447	8.628	11.20906	111.70562	1.9163
MG-5	50	46.3026	7.9459	26.995597	25.3257	8.633	11.17846	111.08765	1.9537
MG-5	55	45.6816	7.6009	26.770866	25.3422	8.621	11.09854	109.42501	1.8787
MG-5	60	44.4051	6.8917	26.429575	25.504	8.584	10.73962	104.23397	1.9556

BW000341

Location	Depth ft	Temp (F)	Temp (C)	Conductivity	Salinity	pH	DO (mg/L)	DO % Sat	Turbidity
MG-5	65	43.2316	6.2398	26.186711	25.7323	8.542	10.51259	100.61487	1.9216
MG-5	70	42.1713	5.6507	26.041274	26.0224	8.502	10.34481	97.78947	1.8738
MG-5	75	41.9006	5.5004	25.999238	26.0917	8.488	10.34715	97.49831	1.9985

D Benthic Identification Spreadsheets

Broadwater Energy Benthic Laboratory Analysis
Station C1

TAXON				Sample ID					
Class	Order	Family	Genus	20050471a		20050471b		20050471c	
				C1N	% Abd	C1C	% Abd	C1S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	30	0.240	11	0.037	18	0.088
Bivalvia (juv.)						7	0.024	24	0.117
	Veneroida	Veneridae	*Mercenaria mercenaria*	1	0.008				
		Tellinidae	*Tellina* sp.	1	0.008	2	0.007	4	0.020
	Pholamyoida	Pandoridae	*Pandora gouldiana*	1	0.008				
	Arcoida	Arcidae (juv.)	*Anadara* sp.					1	0.005
	Nuculoida	Nuculidae	*Nucula* sp.					1	0.005
		Nuculanidae	*Yoldia* sp.	6	0.048	3	0.010	3	0.015
Copepoda				26	0.208	207	0.702	81	0.395
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	4	0.032	9	0.031	2	0.010
	Cumacea							1	0.005
	Amphipoda	Aoridae	*Leptocheirus pinguis*			2	0.007	3	0.015
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	1	0.008				
	Cephalaspidea	Scphanidridae	*Acteocina canaliculata* [2]					1	0.005
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	15	0.120	4	0.014	5	0.024
	Terebellida	Pectinariidae	*Pectinaria gouldii*					1	0.005
		Ampharetidae	*Ampharete arctica*	2	0.016			3	0.015
			Pista palmata			2	0.007		
	Phyllodocida	Arabellidae	*Driloneries* sp.			1	0.003		
		Nephtyidae	*Nephtys* sp.	22	0.176	22	0.075	29	0.141
		Glyceridae	*Glycera* sp.					1	0.005
	Sabellida	Sabellidae		6	0.048	10	0.034	5	0.024
	Cirratulida	Cirratulidae		6	0.048	14	0.047	21	0.102
	Capitellida	Maldanidae	*Asychis elongata*	3	0.024			1	0.005
	Opheliida	Opheliidae	*Travisia carnea*	1	0.008	1	0.003		
Total # of Organisms Identified				**125**		**295**		**205**	
Total # of Organisms in Sample				**125**		**295**		**205**	
Taxa Richness				**15**		**14**		**19**	
Diversity (H_1)				**2.1**		**1.3**		**2.0**	
Eveness				**1.8**		**1.1**		**1.6**	

Notes:

[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C2

TAXON				Sample ID					
Class	Order	Family	Genus	20050346a		20050346b		20050346c	
				C2N	% Abd	C2C	% Abd	C2S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.			4	0.037	2	0.018
Bivalvia (juv.)				8	0.074	47	0.439	39	0.358
	Pholadomyoida	Pandoridae	*Pandora gouldiana*					1	0.009
	Veneroida	Tellinidae	*Tellina* sp.	5	0.046	4	0.037	2	0.018
	Nuculoida	Nuculidae	*Nucula* sp.	2	0.019			2	0.018
		Nuculanidae	*Yoldia* sp.	1	0.009			1	0.009
Copepoda				79	0.731	35	0.327	27	0.248
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.			1	0.009	3	0.028
	Cumacea							1	0.009
Gastropoda	Cephalaspidea	Scaphandridae	*Acteocina canaliculata* [1]	1	0.009	3	0.028		
		Atyidae	*Haminoea solitaria*			2	0.019	2	0.018
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.009	1	0.009	1	0.009
	Terebellida	Ampharetidae	*Ampharete arctica*					4	0.037
			Ampharete sp.			2	0.019		
	Phyllodocida	Glyceridae	*Gylcera* sp.	1	0.009				
		Nephtyidae	*Nephtys* sp.	2	0.019	1	0.009	8	0.073
	Sabellida	Sabellidae		1	0.009				
	Cirratulida	Cirratulidae		7	0.065	7	0.065	16	0.147
Total # of Organisms Identified				**108**		**107**		**109**	
Total # of Organisms in Sample				**630**		**510**		**625**	
Taxa Richness				**11**		**11**		**14**	
Diversity (H_1)				**1.1**		**1.5**		**1.9**	
Eveness				**1.1**		**1.5**		**1.6**	

Notes:
[1] = *Retusa canaliculata* | dominant taxa | dominant species

Broadwater Energy Benthic Laboratory Analysis
Station C3

TAXON				Sample ID					
Class	Order	Family	Genus	20050372a		20050372b		20050372c	
				C3N	% Abd	C3C	% Abd	C3S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	3	0.030			6	0.039
Bivalvia (juv.)				37	0.366	62	0.559	78	0.506
	Veneroida	Veneridae	*Mercenaria mercenaria*	1	0.010	2	0.018		
		Tellinidae	*Tellina* sp.	4	0.040	2	0.018	5	0.032
	Nuculoida	Nuculiidae	*Nucula* sp.	1	0.010	5	0.045	6	0.039
		Nuculanidae	*Yoldia* sp.			2	0.018	1	0.006
Copepoda				15	0.149	12	0.108	11	0.071
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.					2	0.013
	Cumacea							1	0.006
	Amphipoda	Aoridae		1	0.010				
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	2	0.020	3	0.027		
	Cephalaspidea	Atyidae	*Haminoea solitaria*	1	0.010			1	0.006
		Scaphandridae	*Acteocina canaliculata* [2]	1	0.010	1	0.009		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	2	0.020				
	Terebellida	Ampharetidae[3]		1	0.010				
			Ampharete arctica			1	0.009	2	0.013
	Phyllodocida	Nephtyidae	*Nephtys* sp.	6	0.059	9	0.081	13	0.084
	Sabellida	Sabellidae		5	0.050			1	0.006
	Cirratulida	Cirratulidae		20	0.198	12	0.108	26	0.169
	Capitellida	Maldanidae	*Clymenella* sp.	1	0.010				
			Asychis elongata			2	0.018		
Oligochaeta								1	0.006
Total # of Organisms Identified				**101**		**111**		**154**	
Total # of Organisms in Sample				**346**		**368**		**856**	
Taxa Richness				**16**		**12**		**14**	
Diversity (H_1)				**2.0**		**1.5**		**1.7**	
Eveness				**1.7**		**1.4**		**1.5**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* [3]= damaged dominant taxa dominant species

Broadwater Energy Benthic Laboratory Analysis
Station C4

TAXON				Sample ID					
Class	Order	Family	Genus	20050345a		20050345b		20050345c	
				C4N	% Abd	C4C	% Abd	C4S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.					2	0.019
Bivalvia (juv.)				39	0.364	59	0.518	42	0.393
	Veneroida	Tellinidae	*Tellina* sp.	7	0.065	3	0.026	1	0.009
	Arcoida	Arcidae (juv.)	*Anadara* sp.					1	0.009
	Nuculoida	Nuculanidae	*Yoldia* sp.	1	0.009				
		Nuculidae	*Nucula* sp.	2	0.019	4	0.035	2	0.019
Copepoda				20	0.187	19	0.167	33	0.308
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	2	0.019				
		Xanthidae	*Panopeus herbstii*	1	0.009				
	Cumacea							1	0.009
	Amphipoda	Ampeliscidae				2	0.018		
Gastropoda	Caernogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.009		
	Cephalspidea	Scaphanidridae	*Acteocina canaliculata* [2]	3	0.028	2	0.018		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.			3	0.026	1	0.009
	Terebellida	Ampharetidae	*Ampharete arctica*	1	0.009			3	0.028
			Melina cristata	1	0.009				
	Phyllodocida	Nephtyidae	*Nephtys* sp.	7	0.065	4	0.035	7	0.065
	Sabellida	Sabellidae						3	0.028
	Cirratulida	Cirratulidae		21	0.196	16	0.140	10	0.093
	Capitellida	Maldanidae	*Clymenella* sp.					1	0.009
			Asychis elongata	2	0.019	1	0.009		
Total # of Organisms Identified				**107**		**114**		**107**	
Total # of Organisms in Sample				**402**		**783**		**1160**	
Taxa Richness				**13**		**11**		**13**	
Diversity (H_1)				**1.9**		**1.6**		**1.7**	
Eveness				**1.7**		**1.5**		**1.5**	

Notes:

[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* dominant taxa dominant species

Broadwater Energy Benthic Laboratory Analysis
Station IC5

TAXON				Sample ID					
Class	Order	Family	Genus	20050472a		20050472b		20050472c	
				IC5N	% Abd	IC5C	% Abd	IC5S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	28	0.217	14	0.111	10	0.072
Bivalvia (juv.)								42	0.304
	Veneroida	Veneridae	*Mercenaria mercenaria*	2	0.016			2	0.014
		Astartidae	*Astarte undata*	1	0.008				
	Arcoida	Arcidae (juv.)	*Anadara* sp.	4	0.031	12	0.095	5	0.036
	Pholadomyoida	Pandoridae	*Pandora gouldiana*			1	0.008		
Copepoda				21	0.163	13	0.103	28	0.203
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	11	0.085	23	0.183	13	0.094
		Xanthidae	*Panopeus herbstii*	1	0.008				
	Amphipoda	Caprellidae	*Caprella* sp.	1	0.008				
		Ampeliscidae	*Ampelisca* sp.	8	0.062	6	0.048	1	0.007
		Aoridae		2	0.016	6	0.048		
			Leptocheirus pinguis			17	0.135	2	0.014
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	3	0.023				
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	2	0.016	5	0.040	2	0.014
	Terebellida	Ampharetidae	*Ampharete arctica*	12	0.093	3	0.024	3	0.022
	Phyllodocida	Arabellidae	*Drilonereis* sp.					1	0.007
		Nephtyidae	*Nephtys* sp.	10	0.078	8	0.063	8	0.058
		Phyllodocidae	*Phyllodoce* sp.			3	0.024	2	0.014
	Opheliida	Opheliidae	*Travisia carnea*			2	0.016		
	Sabellida	Sabellidae						2	0.014
	Cirratulida	Cirratulidae		18	0.140	4	0.032	11	0.080
	Capitellida	Maldanidae	*Ayschis elongata*	4	0.031	3	0.024	3	0.022
		Arenicolidae	*Arenicola* sp.			4	0.032	2	0.014
	Eunicida	Onuphidae	*Diopatra cuprea*	1	0.008			1	0.007
Oligochaeta						2	0.016		
Total # of Organisms Identified				**129**		**126**		**138**	
Total # of Organisms in Sample				**698**		**788**		**347**	
Taxa Richness				**17**		**17**		**18**	
Diversity (H_1)				**2.4**		**2.5**		**2.1**	
Eveness				**1.9**		**2.1**		**1.7**	

Notes:

[1] = *Nassarius trivittata*　　dominant taxa　　dominant species

Broadwater Energy Benthic Laboratory Analysis
Station IC6

TAXON				Sample ID					
Class	Order	Family	Genus	20050371a		20050371b		20050371c	
				IC6N	% Abd	IC6C	% Abd	IC6S	% Abd
Ascidiacea	Pluerogona	Molgulidae	*Molgula* sp.	3	0.031	9	0.148		
Bivalvia (juv.)				3	0.031	21	0.344	43	0.374
	Veneroida	Tellinidae	*Tellina* sp.	1	0.010	2	0.033	2	0.017
	Arcoida	Arcidae (juv.)	*Anadara* sp.			1	0.016	2	0.017
	Pholadomyoida	Pandoridae	*Pandora gouldiana*					1	0.009
Copepoda				48	0.500	7	0.115	38	0.330
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	14	0.146			5	0.043
		Callinassidae	*Gilvossius setimanus* [2]	2	0.021	1	0.016		
Cumacea				1	0.010			1	0.009
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]					4	0.035
		Nactidae	*Euspera heros*			1	0.016	1	0.009
	Cephalaspidea	Atyidae	*Haminoea solitaria*			1	0.016		
		Scaphandridae	*Acteocina canliculata* [3]			4	0.066	1	0.009
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.010				
		Ampharetidae	*Ampharete arctica*	1	0.010	1	0.016		
	Phyllodcida	Arabellidae	*Drilonereis* sp.			1	0.016	1	0.009
		Nephtyidae	*Nephtys* sp.	7	0.073	9	0.148	4	0.035
	Sabellida	Sabellidae		1	0.010				
	Cirratulida	Cirratulidae		12	0.125	3	0.049	13	0.113
	Capitellida	Maldanidae	*Clymenella* sp.	2	0.021				
Total # of Organisms Identified				**96**		**61**		**115**	
Total # of Organisms in Sample				**330**		**61**		**407**	
Taxa Richness				**13**		**13**		**13**	
Diversity (H_1)				**1.7**		**2.0**		**1.7**	
Eveness				**1.5**		**1.8**		**1.5**	

Notes:
[1] = *Nassarius trivittata* [2]= *Callinassa atlantica* [3]= *Retusa canaliculata* dominant taxa

Broadwater Energy Benthic Laboratory Analysis
Station IC7

TAXON				Sample ID					
Class	Order	Family	Genus	20050370a		20050370b		20050370c	
				IC7N	% Abd	IC7C	% Abd	IC7S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	3	0.048	1	0.010	3	0.039
Bivalvia (juv.)				7	0.113	1	0.010	5	0.065
	Veneroida	Tellinidae	*Tellina* sp.	3	0.048				
	Nuculoida	Nuculanidae	*Yoldia* sp.	2	0.032				
Copepoda				2	0.032	16	0.167	2	0.026
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	2	0.032	17	0.177	48	0.623
		Callianassidae	*Gilvossius setimanus* [4]					1	0.013
	Amphipoda[3]			2	0.032				
		Corophiidae	*Corophium sp.*			1	0.010		
		Ampeliscidae				5	0.052		
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			4	0.042	1	0.013
	Cephalaspidea	Atyidae	*Haminoea solitaria*	3	0.048				
		Scaphandridae	*Acteocina canaliculata* [2]	2	0.032	5	0.052	2	0.026
Polychaeta	Terebellida	Pectinariidae	*Pectinaria gouldii*					1	0.013
		Ampharetidae	*Ampharete arctica*			2	0.021	1	0.013
		Arabellidae	*Drilonereis* sp.			1	0.010	2	0.026
	Phyllodocida	Nephtyidae	*Nephtys* sp.	12	0.194	19	0.198	6	0.078
		Glyceridae	*Glycera* sp.	1	0.016	1	0.010		
		Syllidae[3]				2	0.021		
	Sabellida	Sabellidae		2	0.032	2	0.021		
	Cirratulida	Cirratulidae		11	0.177	10	0.104	4	0.052
	Capitellida	Maldanidae	*Clymenella* sp.					1	0.013
Total # of Organisms Identified				**62**		**96**		**77**	
Total # of Organisms in Sample				**62**		**96**		**77**	
Taxa Richness				**13**		**15**		**13**	
Diversity (H_1)				**2.0**		**2.1**		**1.5**	
Eveness				**1.8**		**1.8**		**1.4**	

Notes: [1] = *Nassarius trivittata* [2]= *Retusa canaliculata*
[3]= damaged 4= *Callinassa atlantica* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station MG5

TAXON				Sample ID					
Class	Order	Family	Genus	20050344a		20050344b		20050344c	
				MG5N	% Abd	MG5C	% Abd	MG5S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.			2	0.019		
Bivalvia	Veneroida	Solenidae	*Ensis directus*			1	0.010		
		Astartidae	*Astarte undata*	3	0.030	8	0.076	10	0.109
		Veneridae	*Mercenaria mercenaria*	2	0.020	1	0.010	1	0.011
	Pholadomyoida	Pandoridae	*Pandora gouldiania*	2	0.020				
	Arcoida	Arcidae	*Anadara traversa*	3	0.030			1	0.011
Copepoda				8	0.080	12	0.114	9	0.098
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	1	0.010			2	0.022
		Xanthidae	*Panopeus herbstii*					1	0.011
		Paguridae	*Pagurus longicarpus*	1	0.010				
	Amphipoda	Ampeliscidae		19	0.190	25	0.238	19	0.207
		Aoridae		21	0.210	8	0.076	10	0.109
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.010	2	0.022
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.					1	0.011
	Terebellida	Ampharetidae	*Ampharete arctica*	26	0.260	29	0.276	25	0.272
	Phyllodocida	Nephtyidae	*Nephtys* sp.	12	0.120	11	0.105	9	0.098
		Phyllodocidae	*Eteone* sp.						
		Glyceridae	*Glycera* sp.	1	0.010	1	0.010		
	Cirratulida	Cirratulidae						1	0.011
			Tharyx sp.	3	0.030			1	0.011
	Capitellida	Maldanidae	*Clymenella* sp.			4	0.038		
	Orbiniida	Paraonidae				1	0.010		
Oligochaeta						1	0.010		
Total # of Organisms Identified				**100**		**105**		**92**	
Total # of Organisms in Sample				**480**		**767**		**400**	
Taxa Richness				**13**		**14**		**14**	
Diversity (H_1)				**2.1**		**2.0**		**2.1**	
Eveness				**1.8**		**1.8**		**1.8**	

Notes:
[1] = *Nassarius trivittata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station MG4

TAXON				Sample ID					
Class	Order	Family	Genus			20050341b			
						MG4C	% Abd		
Bivalvia	Veneroida	Veneridae	*Mercenaria mercenaria*			1	0.010		
		Astartidae	*Astarte undata*			4	0.039		
Copepoda						6	0.058		
Crustacea	Decapoda	Xanthidae	*Panopues herbstii*			3	0.029		
	Amphipoda	Ampeliscidae	*Ampelisca* sp.			40	0.388		
		Pleustidae				1	0.010		
		Aoridae				3	0.029		
			Leptocheirus pinguis			4	0.039		
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.010		
		Calyptraeidae	*Crepidula fornicata*			2	0.019		
			Crepidula plana			1	0.010		
Polychaeta	Terebellida	Ampharetidae	*Ampharete arctica*			14	0.136		
	Phyllodocida	Glyceridae	*Glycera* sp.			2	0.019		
		Nephtyidae	*Nephtys* sp.			9	0.087		
		Phyllodocidae	*Paranaitis speciosa*			2	0.019		
	Sabellida	Sabellidae				1	0.010		
	Cirratulida	Cirratulidae				3	0.029		
	Opheliida	Opheliidae	*Travisia carnea*			6	0.058		
Total # of Organisms Identified						**103**			
Total # of Organisms in Sample						**774**			
Taxa Richness						**18**			
Diversity (H_1)						**2.1**			
Eveness						**1.7**			

Notes:
[1] = *Nassarius trivittata*   dominant taxa   dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station MG3

TAXON				Sample ID					
Class	Order	Family	Genus	20050343a		20050343b		20050343c	
				MG3N	% Abd	MG3C	% Abd	MG3S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.					1	0.011
Bivalvia	Veneroida	Astartidae	*Astarte undata*	2	0.018			2	0.021
		Solenidae	*Ensis directus*	1	0.009				
	Arcoida	Arcidae (juv.)	*Anadara* sp.			1	0.010	1	0.011
Copepoda						6	0.061		
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	2	0.018	4	0.040		
	Cumacea					1	0.010		
	Amphipoda	Caprellidae	*Caprella* sp.			2	0.020		
		Ampeliscidae	*Ampelisca* sp.	46	0.411	31	0.313	26	0.274
		Aoridae		6	0.054	6	0.061		
			Unciola sp.	17	0.152			12	0.126
Gastropoda	Caenogastropoda	Calyptraeidae	*Crepidula fornicata*					2	0.021
Polychaeta	Spionida	Spionidae	*Polydora* sp.					1	0.011
	Terebellida	Ampharetidae	*Ampharete arctica*	18	0.161	27	0.273	27	0.284
	Phyllodocida	Glyceridae	*Glycera* sp.					1	0.011
		Arabellidae	*Arabella iricolor*					1	0.011
		Nephtyidae	*Nephtys* sp.	9	0.080	10	0.101	14	0.147
		Phyllodocidae	*Eteone* sp.	1	0.009				
			Paraintis speciosa	3	0.027				
			Phyllodoce sp.			2	0.020		
	Cirratulida	Cirratulidae	*Tharyx* sp.					1	0.011
	Capitellida	Maldanidae	*Clymenella* sp.	3	0.027	1	0.010		
	Opheliida	Opheliidae	*Travisia carnea*			1	0.010	1	0.011
		Scalibregmidae	*Scalibregma inflatum*	1	0.009	1	0.010	3	0.032
	Archiannelida	Polygordiidae	*Polygordius* sp.	4	0.036	5	0.051	2	0.021
Stelleroida	Forcipulatida	Asteriidae	*Asterias* sp.			1	0.010		
Total # of Organisms Identified				**112**		**99**		**95**	
Total # of Organisms in Sample				**700**		**438**		**906**	
Taxa Richness				**13**		**14**		**15**	
Diversity (H_1)				**1.9**		**2.0**		**1.9**	
Eveness				**1.7**		**1.8**		**1.7**	

Notes:
[1] = *Nassarius trivittata* dominant taxa

Broadwater Energy Benthic Laboratory Analysis
Station IC13

TAXON				Sample ID					
Class	Order	Family	Genus	20050473a		20050473b		20050473c	
				IC13N	% Abd	IC13C	% Abd	IC13S	% Abd
Bivalvia (juv.)						24	0.179	13	0.114
	Veneroida	Veneridae	*Mercenaria mercenaria*	1	0.009			2	0.018
	Pholadomyoida	Pandoridae	*Pandora gouldiana*			1	0.007		
		Lyonsiidae	*Lyonsia hyalina*	2	0.018				
	Arcoida	Arcidae	*Anadara traversa*	4	0.035	21	0.157	8	0.070
Copepoda				6	0.053	16	0.119	10	0.088
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	20	0.177	8	0.060	8	0.070
	Amphipoda	Aoridae		14	0.124	18	0.134	11	0.096
			Leptocheirus pinguis	6	0.053	2	0.015	8	0.070
		Ampelliscidae	*Ampelisca sp.*	20	0.177	5	0.037	14	0.123
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	1	0.009	2	0.015		
		Calyptraedae	*Crepidula plana*	1	0.009				
	Pyramidellamorpha	Pyramidellidae				5	0.037		
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.					1	0.009
		Ampharetidae	*Ampharete arctica*	8	0.071	9	0.067	5	0.044
	Phyllodocida	Arabellidae	*Arabella iricolor*						
		Nephtyidae	*Nephtys* sp.	10	0.088	8	0.060	16	0.140
		Glyceridae	*Glycera sp.*	2	0.018	3	0.022		
		Phyllodocidae	*Phyllodoce* sp.			1	0.007		
		Syllidae		2	0.018				
	Sabellida	Sabellidae		1	0.009	1	0.007		
	Opheliida	Opheliidae	*Travisia carnea*			1	0.007		
	Capitellida	Maldanidae	*Asychis elongata*	11	0.097	9	0.067	18	0.158
		Arenicolidae	*Arenicola* sp.	3	0.027				
Oligochaeta				1	0.009				
Total # of Organisms Identified				**113**		**134**		**114**	
Total # of Organisms in Sample				**920**		**1130**		**751**	
Taxa Richness				**18**		**17**		**12**	
Diversity (H_1)				**2.4**		**2.4**		**2.1**	
Eveness				**1.9**		**2.0**		**1.9**	

Notes:
[1] = *Nassarius trivittata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station IC14

TAXON				Sample ID					
Class	Order	Family	Genus	20050474a		20050474b		20050474c	
				IC14N	% Abd	IC14C	% Abd	IC14S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	2	0.017	6	0.042	5	0.027
Bivalvia (juv.)				30	0.250	28	0.194	6	0.033
	Veneroida	Veneridae	*Mercenaria mercenaria*	2	0.017				
		Tellinidae	*Tellina* sp.	1	0.008	3	0.021	1	0.005
	Arcoida	Arcidae (juv.)	*Anadara* sp.	4	0.033	1	0.007	7	0.038
	Pholadomyoida	Pandoridae	*Pandora gouldiana*	3	0.025	3	0.021	1	0.005
	Nuculoida	Nuculanidae	*Yoldia* sp.			2	0.014	1	0.005
Copepoda				27	0.225	44	0.306	112	0.615
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	1	0.008	6	0.042	7	0.038
		Xanthidae	*Panopeus herbstii*			1	0.007	1	0.005
	Amphipoda	Aoridae		15	0.125	9	0.063	7	0.038
			Leptocheirus pinguis	2	0.017	2	0.014		
		Ampeliscidae	*Ampelisca sp.*	12	0.100	17	0.118	12	0.066
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.007		
	Pyramidellomorpha	Pyramellidae						2	0.011
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.			1	0.007		
	Terebellida	Ampharetidae	*Ampharete arctica*	2	0.017	1	0.007		
	Phyllodocida	Arabellidae	*Driloneries* sp.			1	0.007		
		Nephtyidae	*Nephtys* sp.	7	0.058	10	0.069	10	0.055
		Sylliidae				1	0.007		
	Sabellida	Sabellidae		3	0.025	1	0.007	2	0.011
	Cirratulida	Cirratulidae		1	0.008			8	0.044
	Capitellida	Maldanidae	*Asychis elongata*	8	0.067	6	0.042		
Total # of Organisms Identified				**120**		**144**		**182**	
Total # of Organisms in Sample				**120**		**144**		**182**	
Taxa Richness				**16**		**20**		**15**	
Diversity (H_1)				**2.2**		**2.2**		**1.6**	
Eveness				**1.8**		**1.7**		**1.3**	

Notes:
[1] = *Nassarius trivittata* — dominant taxa — dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C15

TAXON				Sample ID					
Class	Order	Family	Genus	20050369a		20050369b		20050369c	
				C15N	% Abd	C15C	% Abd	C15S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	5	0.051	11	0.095		
Bivalvia (juv.)				37	0.378	67	0.578	63	0.600
	Veneroida	Veneridae	*Mercenaria mercenaria*			3	0.026		
		Tellinidae	*Tellina* sp.	9	0.092	3	0.026		
	Arcoida	Arcidae (juv.)	*Anadara* sp.					2	0.019
	Pholadomyoida	Pandoridae	*Pandora gouldiana*	1	0.010	1	0.009		
Copepoda				9	0.092				
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	2	0.020	5	0.043	3	0.029
		Xanthidae	*Panopeus herbstii*	1	0.010				
	Cumacea							2	0.019
	Amphipoda	Ampeliscidae						6	0.057
		Corophiidae	*Corophium sp.*					5	0.048
		Aoridae				2	0.017		
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	2	0.020			2	0.019
	Cephalaspidea	Atyidae	*Haminoea solitaria*	3	0.031	1	0.009	1	0.010
		Scaphanidridae	*Acteocina canaliculata* [2]	4	0.041	4	0.034	3	0.029
	Pyramidellomorpha	Pyramellidae		2	0.020	3	0.026		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.010	1	0.009		
	Phyllodocida	Arabellidae	*Drilonereis* sp.	1	0.010				
		Nephtyidae	*Nephtys* sp.	9	0.092	8	0.069	6	0.057
	Sabellida	Sabellidae		1	0.010			2	0.019
	Cirratulida	Cirratulidae		3	0.031			2	0.019
	Capitellida	Maldanidae	*Clymenella* sp.	4	0.041	4	0.034	4	0.038
			Asychis elongata	4	0.041	3	0.026	4	0.038
Total # of Organisms Identified				**98**		**116**		**105**	
Total # of Organisms in Sample				**211**		**500**		**273**	
Taxa Richness				**18**		**14**		**14**	
Diversity (H_1)				**2.3**		**1.7**		**1.7**	
Eveness				**1.8**		**1.5**		**1.4**	

Notes:
[1] = *Nassarius trivittata* [2] =*Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C16

TAXON				Sample ID					
Class	Order	Family	Genus	20050349a		20050349b		20050349c	
				C16N	% Abd	C16C	% Abd	C16S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	4	0.040	2	0.021	2	0.021
Bivalvia (juv.)				11	0.109	10	0.106	21	0.221
	Veneroida	Veneridae	*Mercenaria mercenaria*			3	0.032		
		Tellinidae	*Tellina* sp.			1	0.011		
	Nuculoida	Nuculidae	*Nucula* sp.	2	0.020				
		Nuculanidae	*Yoldia* sp.	4	0.040	4	0.043		
Copepoda				44	0.436	33	0.351	18	0.189
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	5	0.050	10	0.106	16	0.168
		Xanthidae	*Panopeus herbstii*	1	0.010			1	0.011
	Cumacea					3	0.032	2	0.021
	Amphipoda	Caprellidae	*Caprella* sp.					3	0.032
		Corophiidae						3	0.032
			Corophium sp.			1	0.011		
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.011		
	Cephalaspidea	Atyidae	*Haminoea solitaria*	4	0.040	1	0.011		
		Scaphanidridae	*Acteocina canaliculata* [2]	6	0.059	4	0.043	2	0.021
	Pyramidellomorpha	Pyramellidae		8	0.079	4	0.043		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	2	0.020	2	0.021	4	0.042
	Terebellida	Ampharetidae	*Ampharete arctica*			3	0.032	1	0.011
	Phyllodocida	Nereidae	*Nereis succinea*					1	0.011
		Glyceridae	*Glycera* sp.			1	0.011		
		Arabellidae	*Arabella iricolor*						
		Nephtyidae	*Nephtys* sp.	6	0.059	4	0.043	5	0.053
	Sabellida	Sabellidae		3	0.030	3	0.032	2	0.021
	Cirratulida	Cirratulidae				3	0.032		
	Capitellida	Maldanidae	*Clymenella* sp.	1	0.010	1	0.011	2	0.021
Total # of Organisms Identified				**101**		**94**		**95**	
Total # of Organisms in Sample				**240**		**270**		**365**	
Taxa Richness				**14**		**20**		**15**	
Diversity (H_1)				**2.0**		**2.4**		**2.0**	
Eveness				**1.8**		**1.8**		**1.7**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C17

TAXON				Sample ID					
Class	Order	Family	Genus	20050348a		20050348b		20050348c	
				C17N	% Abd	C17C	% Abd	C17S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	8	0.105	3	0.039	2	0.027
Bivalvia (juv.)				14	0.184	11	0.143	8	0.110
	Pholadomyoida	Pandoridae	*Pandora gouldiana*			1	0.013	1	0.014
	Veneroida	Veneridae	*Mercenaria mercenaria*	2	0.026				
		Tellinidae	*Tellina* sp.	6	0.079	9	0.117	3	0.041
	Arcoida	Arcidae (juv.)	*Anadara* sp.			1	0.013		
	Nuculoida	Nuculidae	*Nucula* sp.	2	0.026	2	0.026	2	0.027
Copepoda				6	0.079	8	0.104	14	0.192
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	8	0.105	7	0.091	17	0.233
	Cumacea							1	0.014
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	1	0.013				
	Cephalaspidea	Atyidae	*Haminoea solitaria*	4	0.053	1	0.013		
		Scaphanidridae	*Ateocina canaliculata* [2]	9	0.118	7	0.091	4	0.055
	Pyramidellomorpha	Pyramellidae		1	0.013	4	0.052	1	0.014
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	4	0.053			1	0.014
	Terebellida	Ampharetidae	*Ampharete arctica*	1	0.013	2	0.026		
	Phyllodocida	Arabellidae	*Drilonereis* sp.					1	0.014
		Nephtyidae	*Nephtys* sp.	5	0.066	2	0.026	8	0.110
	Sabellida	Sabellidae		4	0.053	18	0.234	7	0.096
	Cirratulida	Cirratulidae							
	Capitellida	Maldanidae	*Clymenella* sp.	1	0.013			3	0.041
			Asychis elongata			1	0.013		
Total # of Organisms Identified				**76**		**77**		**73**	
Total # of Organisms in Sample				**76**		**77**		**73**	
Taxa Richness				**16**		**15**		**15**	
Diversity (H_1)				**2.5**		**2.3**		**2.3**	
Eveness				**2.1**		**2.0**		**1.9**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa cnaliculata* dominant taxa dominant species, when totaled = at least 50% sam

Broadwater Energy Benthic Laboratory Analysis
Station C18

TAXON				Sample ID					
Class	Order	Family	Genus	20050318a		20050318b		20050318c	
				C18N	% Abd	C18C	% Abd	C18S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	5	0.041	3	0.027	5	0.053
Bivalvia (juv.)				7	0.057	3	0.027	3	0.032
	Veneroida	Solenidae	*Ensis directus*	1	0.008				
		Tellinidae	*Tellina* sp.	4	0.033	1	0.009	2	0.021
	Arcoida	Arcidae (juv.)	*Anadara traversa*			1	0.009		
	Nuculoida	Nuculanidae							
Copepoda				17	0.138	6	0.054	17	0.181
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	29	0.236	8	0.071	3	0.032
		Xanthidae	*Panopeus herbstii*					2	0.021
	Cumacea					1	0.009		
	Amphipoda	Aoridae	*Leptocheirus pinguis*	14	0.114	19	0.170	6	0.064
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]	3	0.024			3	0.032
		Calyptraedae	*Crepidula fornicata*	1	0.008			2	0.021
	Pyramidellomorpha	Pyramellidae						1	0.011
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.008			1	0.011
	Terebellida	Pectinariidae	*Pectinaria gouldii*			1	0.009	1	0.011
		Ampharetidae	*Ampharete arctica*	8	0.065	13	0.116	8	0.085
	Phyllodocida	Glyceridae	*Glycera* sp.	2	0.016	1	0.009	1	0.011
		Nephtyidae	*Nephtys* sp.	22	0.179	22	0.196	21	0.223
		Phyllodocidae	*Phyllodoce* sp.			2	0.018		
			Paranaitis speciosa	2	0.016			3	0.032
	Sabellida	Sabellidae		2	0.016	2	0.018		
	Cirratulida	Cirratulidae				1	0.009	1	0.011
	Capitellida	Maldanidae	*Clymenella* sp.	5	0.041	21	0.188	6	0.064
			Asychis elongata					8	0.085
	Opheliida	Ophellidae	*Travisia carnea*			2	0.018		
Oligochaeta						6	0.054		
Total # of Organisms Identified				**123**		**112**		**94**	
Total # of Organisms in Sample				**1386**		**1220**		**1400**	
Taxa Richness				**16**		**18**		**19**	
Diversity (H_1)				**2.3**		**2.3**		**2.5**	
Eveness				**1.9**		**1.9**		**2.0**	

Notes:
[1] = *Nassarius trivittata* | dominant taxa | dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C19

TAXON				Sample ID					
Class	Order	Family	Genus	20050319a		20050319b		20050319c	
				C19N	% Abd	C19C	% Abd	C19S	% Abd
Bivalvia (juv.)				3	0.033	3	0.028	7	0.056
	Veneroida	Veneridae	*Mercenaria mercenaria*	1	0.011				
		Tellinidae	*Tellina* sp.			4	0.038	3	0.024
	Arcoida	Arcidae (juv.)	*Anadara* sp.	2	0.022	3	0.028		
Copepoda				17	0.185	26	0.245	53	0.421
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.			3	0.028	2	0.016
		Paguridae	*Pagurus longicarpus*	1	0.011			2	0.016
		Callinassidae	*Gilvossius setimenus* [2]			1	0.009	1	0.008
	Amphipoda	Ampelliscidae	*Ampelisca* sp.	2	0.022	2	0.019	7	0.056
		Aoridae		4	0.043	6	0.057	3	0.024
			Leptocheirus pinguis	4	0.043	6	0.057		
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			2	0.019	1	0.008
		Calyptereidae	*Crepidula fornicata*			7	0.066		
	Pyramidellomorpha	Pyramellidae				5	0.047		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.011	4	0.038	2	0.016
	Orbiniida	Orbiniidae	*Scoloplos fragilis*			1	0.009		
	Terebellida	Ampharetidae	*Ampharete arctica*	24	0.261	13	0.123	17	0.135
	Phyllodocida	Glyceridae	*Glycera* sp.	2	0.022			1	0.008
		Nephtyidae	*Nephtys* sp.	14	0.152	13	0.123	16	0.127
		Phyllodocidae	*Phyllodoce* sp.	1	0.011			1	0.008
	Sabellida	Sabellidae		2	0.022	3	0.028	2	0.016
	Cirratulida	Cirratulidae		2	0.022			3	0.024
	Capitellida	Maldanidae	*Asychis elongata*	5	0.054	5	0.047	5	0.040
	Opheliida	Opheliidae	*Travisia carnea*	6	0.065	1	0.009		
		Scalibregmidae	*Scalibregma inflatum*	1	0.011				
Oligochaeta				2	0.022				
Total # of Organisms Identified				**92**		**106**		**126**	
Total # of Organisms in Sample				**1034**		**1220**		**970**	
Taxa Richness				**19**		**19**		**17**	
Diversity (H_1)				**2.4**		**2.6**		**2.0**	
Eveness				**1.9**		**2.0**		**1.6**	

Notes:
[1] = *Nassarius trivittata* [2]= *Callinassa atlantica* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C20

TAXON				Sample ID					
Class	Order	Family	Genus	20050342a		20050342b		20050342c	
				C20N	% Abd	C20C	% Abd	C20S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.			2	0.018		
Bivalvia	Veneroida	Veneridae	*Mercenaria mercenaria*	2	0.022	7	0.062	1	0.007
		Tellinidae	*Tellina* sp.			1	0.009	1	0.007
	Arcoida	Arcidae (juv.)	*Anadara* sp.	2	0.022	1	0.009	4	0.027
Copepoda				1	0.011	3	0.027		
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.			2	0.018	7	0.047
		Xanthidae	*Panopeus herbstii*	2	0.022			9	0.060
	Cumacea					1	0.009		
	Amphipoda	Aoridae		5	0.055	15	0.133	14	0.093
			Leptocheirus pinguis	6	0.066	1	0.009	4	0.027
		Ampeliscidae	*Ampelisca* sp.	7	0.077	16	0.142	26	0.173
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			1	0.009		
		Calyptraeidae	*Crepidula plana*	12	0.132			34	0.227
			Crepidula fornicata	6	0.066			10	0.067
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.011	4	0.035	2	0.013
	Terebellida	Pectinariidae	*Pectinaria gouldii*						
		Ampharetidae	*Ampharete arctica*	17	0.187	19	0.168	14	0.093
	Phyllodocida	Glyceridae	*Glycera* sp.	1	0.011				
		Nephtyidae	*Nephtys* sp.	19	0.209	14	0.124	9	0.060
		Phyllodocidae	*Paranaitis speciosa*					1	0.007
	Sabellida	Sabellidae		3	0.033	4	0.035	2	0.013
	Cirratulida	Cirratulidae		1	0.011			4	0.027
	Capitellida	Maldanidae	*Asychis elongata*	3	0.033	16	0.142	10	0.067
	Opheliida	Opheliidae	*Travisia carnea*	3	0.033	1	0.009	1	0.007
Oligochaeta								1	0.006667
Total # of Organisms Identified				**91**		**113**		**150**	
Total # of Organisms in Sample				**483**		**113**		**150**	
Taxa Richness				**17**		**17**		**18**	
Diversity (H_1)				**2.4**		**2.3**		**2.5**	
Eveness				**2.0**		**1.9**		**2.0**	

Notes:
[1] = *Nassarius trivittata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C21

TAXON				Sample ID					
Class	Order	Family	Genus	20050475a		20050475b		20050475c	
				C21	% Abd	C21C	% Abd	C21S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	4	0.037	2	0.016	4	0.034
Bivalvia	Veneroida	Solenidae	*Ensis directus*	4	0.037	2	0.016		
		Veneridae	*Mercenaria mercenaria*			2	0.016	2	0.017
		Tellinidae	*Tellina* sp.	2	0.019	5	0.039	3	0.025
		Astartidae	*Astarte undata*	1	0.009			1	0.008
	Pholadomyoida	Pandoridae	*Pandora gouldiana*	1	0.009	3	0.023	1	0.008
Copepoda				13	0.120	12	0.094	15	0.127
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	23	0.213	18	0.141	23	0.195
		Majidae	*Libinia emarginata*					1	0.008
	Amphipoda	Aoridae				10	0.078	4	0.034
			Leptocheirus pinguis	13	0.120	7	0.055	13	0.110
		Ampeliscidae	*Ampelisca* sp.	15	0.139	21	0.164	21	0.178
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	1	0.009			5	0.042
	Terebellida	Ampharetidae	*Ampharete arctica*	8	0.074	19	0.148	6	0.051
		Nephtyidae	*Nephtys* sp.	17	0.157	15	0.117	11	0.093
		Phyllodocidae	*Phyllodoce* sp.			1	0.008		
		Glyceridae	*Glycera* sp.	2	0.019	3	0.023	1	0.008
	Sabellida	Sabellidae		1	0.009			2	0.017
	Cirratulida	Cirratulidae				1	0.008	1	0.008
	Capitellida	Maldanidae	*Asychis elongata*			7	0.055	4	0.034
		Arenicolidae	*Arenicola* sp.	3	0.028				
Total # of Organisms Identified				**108**		**128**		**118**	
Total # of Organisms in Sample				**690**		**1120**		**674**	
Taxa Richness				**15**		**16**		**18**	
Diversity (H_1)				**2.3**		**2.4**		**2.4**	
Eveness				**1.9**		**2.0**		**1.9**	

Notes:
[1] = *Nassarius trivittata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C22

TAXON				Sample ID					
Class	Order	Family	Genus	20050476a		20050476b		20050476c	
				C22N	% Abd	C22C	% Abd	C22S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	12	0.200	8	0.129	7	0.140
Bivalvia (juv.)						4	0.065	2	0.040
	Veneroida	Veneridae	*Mercenaria mercenaria*					2	0.040
	Pholadomyoida	Pandoridae	*Pandora gouldiana*	2	0.033				
	Nuculoida	Nuculanidae	*Yoldia* sp.	2	0.033	1	0.016		
Copepoda				11	0.183	3	0.048	2	0.040
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	7	0.117	6	0.097	4	0.080
		Callinassidae	*Gilvossius setamanus* [2]	1	0.017				
	Cumacea							1	0.020
	Amphipoda	Ampellisicidae	*Ampelisca* sp.	2	0.033	3	0.048	3	0.060
		Aoridae		3	0.050	7	0.113	7	0.140
Gastropoda	Cephalaspidea	Scaphanidridae	*Acteocina canaliculata* [1]					1	0.020
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	1	0.017				
	Terebellida	Pectinariidae	*Pectinaria gouldii*						
		Ampharetidae	*Pista palmata*	2	0.033				
			Ampharete sp.			3	0.048		
	Phyllodocida	Arabellidae	*Drilonereis* sp.	1	0.017				
		Nephtyidae	*Nephtys* sp.	10	0.167	13	0.210	13	0.260
		Glyceridae	*Glycera* sp.			1	0.016	1	0.020
		Nereidae	Nereis succinea			1	0.016		
	Sabellida	Sabellidae		1	0.017	3	0.048	5	0.100
	Cirratulida	Cirratulidae							
	Capitellida	Maldanidae	*Asychis elongata*	5	0.083	9	0.145	2	0.040
Total # of Organisms Identified				**60**		**62**		**50**	
Total # of Organisms in Sample				**60**		**62**		**50**	
Taxa Richness				**14**		**13**		**13**	
Diversity (H_1)				**2.3**		**2.1**		**2.3**	
Eveness				**2.0**		**1.9**		**2.0**	

Notes:

[1] = *Retusa canaliculata* [2]= *Callinassa atlantica*

dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C23

TAXON				Sample ID					
Class	Order	Family	Genus	20050479a		20050479b		20050479c	
				C23N	% Abd	C23C	% Abd	C23S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	11	0.089	4	0.036	9	0.057
Bivalvia (juv.)				9	0.073	11	0.098	20	0.127
	Veneroida	Veneridae	*Mercenaria mercenaria*					6	0.038
	Pholadomyoida	Pandoridae	*Pandora gouldiana*					3	0.019
	Arcidae	Arcidae (juv.)	*Anadara* sp.			1	0.009		
	Nuculoida	Nuculanidae	Sabellidae			2	0.018	16	0.102
Copepoda				83	0.669	55	0.491	9	0.057
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	4	0.032	3	0.027	2	0.013
		Xanthidae	*Panopeus herbstii*						
	Cumacea			1	0.008			6	0.038
	Amphipoda	Aoridae		2	0.016	3	0.027	2	0.013
		Ampeliscidae	*Ampelisca* sp.					8	0.051
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]			3	0.027	3	0.019
	Pyramidellomorpha	Pyramellidae		1	0.008	16	0.143	20	0.127
	Cephalaspidea	Atyidae	*Haminoea solitaria*					4	0.025
		Scaphanidrdae	*Acteocina canaliculata* [2]	4	0.032	2	0.018	2	0.013
Polychaeta	Terebellida	Pectinariidae	*Pectinaria gouldii*			1	0.009		
		Ampharetidae	*Ampharete arctica*						
			Melina cristata					1	0.006
	Phyllodocida	Arabellidae	*Drilonereis* sp.					1	0.006
		Nephtyidae	*Nephtys* sp.	6	0.048	4	0.036	12	0.076
		Nereidae	*Nereis succinea*			1	0.009	2	0.013
	Sabellida	Sabellidae		3	0.024	1	0.009	9	0.057
	Cirratulida	Cirratulidae				1	0.009		
	Capitellida	Maldanidae	*Asychis elongata*			2	0.018	10	0.064
Total # of Organisms Identified				**124**		**112**		**157**	
Total # of Organisms in Sample				**481**		**112**		**157**	
Taxa Richness				**10**		**16**		**20**	
Diversity (H_1)				**1.3**		**1.8**		**2.6**	
Eveness				**1.3**		**1.5**		**2.0**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C24

TAXON				Sample ID					
Class	Order	Family	Genus	20050480a		20050480b		20050480c	
				C24N	% Abd	C24C	% Abd	C24S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	7	0.069	15	0.156	15	0.133
Bivalvia (juv.)				8	0.078	5	0.052	13	0.115
	Veneroida	Veneridae	*Mercenaria mercenaria*			1	0.010		
		Tellinidae	*Tellina* sp.					3	0.027
	Pholadomyoida	Pandoridae	*Pandora gouldiana*			1	0.010	2	0.018
	Nuculoida	Nuculanidae	*Yoldia* sp.	2	0.020	3	0.031	2	0.018
Copepoda				17	0.167	9	0.094	13	0.115
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	21	0.206	7	0.073	4	0.035
		Callinassidae	*Gilvossius setimenus*[3]	1	0.010	1	0.010		
	Cumacea			1	0.010	3	0.031	1	0.009
	Amphipoda	Aoridae		6	0.059	5	0.052	7	0.062
		Ampeliscidae	*Ampelisca* sp.	5	0.049	9	0.094	2	0.018
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata*[1]					2	0.018
	Pyramidellamorpha	Pyramidellidae		1	0.010			2	0.018
	Cephalaspidea	Atyidae	*Haminoea solitaria*			1	0.010	1	0.009
		Scaphanididrae	*Acteocina canaliculata*[2]	1	0.010	2	0.021	1	0.009
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	3	0.029			3	0.027
	Terebellida	Ampharetidae	*Ampharete arctica*	4	0.039			6	0.053
			Melina cristata			1	0.010	1	0.009
	Phyllodocida	Nephtyidae	*Nephtys* sp.	12	0.118	20	0.208	22	0.195
		Nereidae	*Nereis succinea*					3	0.027
		Sylliidae				2	0.021		
	Sabellida	Sabellidae		7	0.069			3	0.027
	Capitellida	Maldanidae	*Asychis elongata*	6	0.059	5	0.052	7	0.062
Total # of Organisms Identified				**102**		**96**		**113**	
Total # of Organisms in Sample				**102**		**96**		**113**	
Taxa Richness				**16**		**17**		**21**	
Diversity (H_1)				**2.3**		**2.3**		**2.6**	
Eveness				**1.9**		**1.9**		**2.0**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* [3]= *Callinassa atlantica* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C25

TAXON				Sample ID					
Class	Order	Family	Genus	20050482a		20050482b		20050482c	
				C25N	% Abd	C25C	% Abd	C25S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	5	0.050	24	0.182	4	0.037
Bivalvia (juv.)				6	0.060	8	0.061	34	0.312
	Veneroida	Veneridae	*Mercenaria mercenaria*	1	0.010	3	0.023		
	Pholadomyoida	Pandoridae	*Pandora gouldinana*	2	0.020	2	0.015		
	Arcoida	Arcidae (juv.)	*Anadara* sp.			2	0.015	1	0.009
	Nuculoida	Nuculanidae	*Yoldia* sp.	3	0.030	2	0.015	4	0.037
		Nuculidae	*Nucula* sp.	1	0.010				
Copepoda				6	0.060	9	0.068	2	0.018
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	12	0.120	5	0.038	8	0.073
		Xanthidae	*Panopeus herbstii*			2	0.015		
	Cumacea					1	0.008		
	Amphipoda	Aoridae		1	0.010	5	0.038		
		Ampeliscidae	*Ampelisca* sp.	3	0.030	17	0.129	7	0.064
Gastropoda	Pyramidellomorpha	Pyramidellidae		1	0.010				
	Cephalaspidea	Atyidae	*Haminoea solitaria*	3	0.030	1	0.008	1	0.009
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.	4	0.040	2	0.015	4	0.037
	Terebellida	Ampharetidae	*Ampharete arctica*	2	0.020			3	0.028
			Melina cristata	2	0.020	3	0.023	4	0.037
			Pista palmata			2	0.015		
	Phyllodocida	Arabellidae	*Drilonereis* sp.					1	0.009
		Nephtyidae	*Nephtys* sp.	16	0.160	19	0.144	21	0.193
		Phyllodocidae	*Eteone* sp.						
		Nereidae	*Nereis succinea*	4	0.040	4	0.030	2	0.018
		Polynoidae	*Harmothoe* sp.	1	0.010				
	Sabellida	Sabellidae		13	0.130	11	0.083	4	0.037
	Cirratulida	Cirratulidae		1	0.010	7	0.053		
	Capitellida	Maldanidae	*Asychis elongata*	13	0.130	2	0.015	9	0.083
Total # of Organisms Identified				**100**		**132**		**109**	
Total # of Organisms in Sample				**100**		**132**		**109**	
Taxa Richness				**21**		**21**		**16**	
Diversity (H_1)				**2.6**		**2.6**		**2.2**	
Eveness				**2.0**		**2.0**		**1.9**	

Notes: dominant taxa | dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C26

TAXON				Sample ID					
Class	Order	Family	Genus	20050481a		20050481b		20050481c	
				C26N	% Abd	C26C	% Abd	C26S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	11	0.056			11	0.111
Bivalvia (juv.)				13	0.067	1	0.056	11	0.111
	Veneroida	Veneridae	*Mercenaria mercenaria*	5	0.026			4	0.040
	Nuculoida	Nuculanidae	*Yoldia* sp.	2	0.010			4	0.040
Copepoda				33	0.169			12	0.121
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	22	0.113	3	0.167	5	0.051
		Porcellanidae	*Polyonyx gibbesi*			2	0.111		
		Callinassidae	*Gilvossius setemanus* [2]	1	0.005				
	Cumacea			4	0.021			1	0.010
	Amphipoda	Ampeliscidae	*Ampelisca* sp.	11	0.056	3	0.167	9	0.091
		Aoridae						1	0.010
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]					2	0.020
	Cephalaspidea	Scaphanidridae	*Acteocina canaliculata* [3]	1	0.005				
		Atyidae	*Haminoea solitaria*					2	0.020
Polychaeta	Flabellgerida	Flabelligeridae	*Pherusa* sp.					2	0.020
	Terebellida	Ampharetidae	*Ampharete arctica*	6	0.031				
	Phyllodocida	Nephtyidae	*Nephtys* sp.	17	0.087	4	0.222	18	0.182
		Sylliidae				1	0.056	5	0.051
	Sabellida	Sabellidae		4	0.021	2	0.111	6	0.061
	Cirratulida	Cirratulidae		63	0.323			4	0.040
	Capitellida	Maldanidae	*Clymenella* sp.					1	0.010
			Asychis elongata	2	0.010			1	0.010
Total # of Organisms Identified				**195**		**18**		**99**	
Total # of Organisms in Sample				**195**		**18**		**99**	
Taxa Richness				**15**		**7**		**18**	
Diversity (H_1)				**2.1**		**1.7**		**2.6**	
Eveness				**1.8**		**2.1**		**2.0**	

Notes:
[1] = *Nassarius trivittata* [2]= *Callinassa atlantica* [3]= *Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C27

TAXON				Sample ID					
Class	Order	Family	Genus	20050477a		20050477b		20050477c	
				C27N	% Abd	C27C	% Abd	C27S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	15	0.096	10	0.072	11	0.089
Bivalvia (juv.)								4	0.033
	Veneroida	Veneridae	*Mercenaria mercenaria*	6	0.038	4	0.029	3	0.024
		Tellinidae	*Tellina* sp.	2	0.013	2	0.014		
	Nuculoida	Nuculidae	*Nucula* sp.	1	0.006	2	0.014		
		Nuculanidae	*Yoldia* sp.			3	0.022		
Copepoda				26	0.167	27	0.196	9	0.073
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	10	0.064	2	0.014	2	0.016
	Cumacea					2	0.014		
	Amphipoda	Ampelisicidae	*Ampelisca* sp.	10	0.064	3	0.022	6	0.049
Gastropoda	Caenogastropoda	Nassariidae	*Ilyanassa trivittata* [1]					1	0.008
	Cephalaspidea	Atyidae	*Haminoea solitaria*			5	0.036		
		Scaphanidridae	*Acteocina canaliculata* [2]			1	0.007		
	Pyramidellomorpha	Pyramellidae		1	0.006	1	0.007		
Polychaeta	Flabelligerida	Flabelligeridae	*Pherusa* sp.	1	0.006	1	0.007	1	0.008
	Terebellida	Pectinariidae	*Pectinaria gouldii*						
		Ampharetidae	*Ampharete arctica*	5	0.032			1	0.008
			Pista palmata			1	0.007		
			Melina cristata			3	0.022	1	0.008
	Phyllodocida	Nephtyidae	*Nephtys* sp.	21	0.135	10	0.072	29	0.236
		Nereididae	*Nereis succinea*					1	0.008
	Sabellida	Sabellidae		8	0.051	13	0.094	7	0.057
	Cirratulida	Cirratulidae		47	0.301	43	0.312	42	0.341
	Capitellida	Maldanidae	*Asychis elongata*	1	0.006			2	0.016
			Clymenella sp.	2	0.013	5	0.036	3	0.024
Total # of Organisms Identified				**156**		**138**		**123**	
Total # of Organisms in Sample				**156**		**138**		**123**	
Taxa Richness				**15**		**19**		**16**	
Diversity (H_1)				**2.1**		**2.3**		**2.0**	
Eveness				**1.8**		**1.8**		**1.7**	

Notes:
[1] = *Nassarius trivittata* [2]= *Retusa canaliculata* dominant taxa dominant species, when totaled = at least 50% sample

Broadwater Energy Benthic Laboratory Analysis
Station C28

TAXON				Sample ID					
Class	Order	Family	Genus	20050478a		200504787b		20050478c	
				C28N	% Abd	C28C	% Abd	C28S	% Abd
Ascidiacea	Pleurogona	Molgulidae	*Molgula* sp.	27	0.229	21	0.172	12	0.061
Bivalvia (juv.)				2	0.017	13	0.107	10	0.051
	Veneroida	Veneridae	*Mercenaria mercenaria*			7	0.057	6	0.030
		Tellinidae	*Tellina* sp.	1	0.008	1	0.008		
	Pholadomyoida	Pandoridae	*Pandora gouldiana*			1	0.008	4	0.020
	Nuculoida	Nuculanidae	*Yoldia* sp.	1	0.008	1	0.008		
Copepoda				51	0.432	16	0.131	49	0.249
Crustacea	Decapoda	Pinnotheridae	*Pinnixa* sp.	12	0.102	9	0.074	2	0.010
		Callinassidae	*Gilvossius setemanus*	1	0.008				
	Cumacea			5	0.042	3	0.025	4	0.020
	Amphipoda	Aoridae				2	0.016		
			Leptocheirus pinguis			1	0.008		
		Ampeliscidae	*Ampelisca* sp.	1	0.008	13	0.107	5	0.025
Polychaeta	Terebellida	Ampharetidae	*Ampharete arctica*	3	0.025	7	0.057	5	0.025
	Phyllodocida	Arabellidae	*Drilonereis* sp.			1	0.008		
		Nephtyidae	*Nephtys* sp.	10	0.085	17	0.139	24	0.122
		Syllidae						5	0.025
	Sabellida	Sabellidae		2	0.017	3	0.025	5	0.025
	Cirratulida	Cirratulidae		9	0.076	6	0.049	66	0.335
Total # of Organisms Identified				**118**		**122**		**197**	
Total # of Organisms in Sample				**118**		**122**		**197**	
Taxa Richness				**13**		**17**		**13**	
Diversity (H_1)				**1.9**		**2.4**		**2.0**	
Eveness				**1.7**		**2.0**		**1.8**	

Notes:
1 = *Nassarius trivittata* dominant taxa dominant species, when totaled = at least 50% sample

E

Drop Camera Video

Broadwater Benthic Video

August 2005

Prepared for:

Ecology and Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Drive
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By:

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1. Introduction

Broadwater Energy (Broadwater) is a joint venture between Shell US Gas and Power, LLC and TransCanada Pipeline USA Ltd. Broadwater Energy is planning to import liquefied natural gas (LNG) to a floating terminal in Long Island Sound. The proposed location of the terminal is nine miles off of Riverhead, NY and 11 miles from the Connecticut shoreline. The terminal, known as a Floating Storage Re-Gasification Unit (FSRU) will be connected to the existing Iroquois Gas Transmission system via a submarine pipeline. The pipeline will be approximately 25 miles long.

Long Island Sound (the Sound) is home to a well developed and mature (high abundance and diversity) invertebrate community. The benthic invertebrate community in particular is an important part of the marine environment in the Sound. The benthic community consists of a wide variety of small aquatic invertebrates which live burrowed into or in contact with the substrate, such as worms (polychaetes and oligochaetes), crustaceans (shrimp, lobster and amphipods) and bivalves (clams and mussels). Because they are suspension and deposit feeders, benthic organisms cycle nutrients from the sediment and water column to higher trophic levels. The sediment is modified by the benthos through bioturbation and formation of fecal pellets (Wildish and Kristmanson, 1997).

Life strategies of the benthos are tightly coupled with sediment characteristics. The distribution and abundance of benthic invertebrates is influenced by a wide variety of physical parameters (substrate, water temperature, dissolved oxygen, pH, salinity, and hydrodynamics). Benthic organisms can provide information about local environmental conditions because they live and feed on the sediment and have limited mobility. The abundance, diversity, and composition of benthic species, in combination with their relative pollution tolerance, are indicators of habitat quality. When an area is disturbed, the benthic community is often the first to reestablish, especially if sediment conditions are improved relative to previous conditions. Due to the dependence of the benthic community on sediment properties and its importance as a food source for fish, it is important to understand how activities associated with pipeline installation may affect the benthic community and further to understand the timing of reestablishment.

2. Methods

In April and May 2005 underwater video was taken along transects to characterize the benthic community along the proposed pipeline route. A drop camera was lowered over the side of the research vessel at twenty-seven (27) sites. It was lowered to the depth for the specific sample location as indicated by the fathometer on the research vessel. The drop camera was allowed to stabilize in the water column until it remained steady enough to obtain a good image. An onboard monitor was used to make sure that the camera was steady and to make initial observations of the benthic community. Once the image was steady, a slow trawl across the bottom captured the bottom video for that location.

Underwater video observations are best used to supplement existing benthic data. Due to the camera movement, shadows, camera magnification and video quality it is often difficult to confirm species identification and to determine abundances using only video observations. The underwater video was reviewed by LMS. Results of the benthic characterization based on the video observations are provided below. Video locations are depicted on Figure 1.

3. Existing Benthic Community

The sea floor along the proposed pipeline route is comprised of fine-grained sediments (fine sand, silt and clay) with few rock mounds (sites MG 1, MG2 and MG3 in the vicinity of Stratford Shoal) and amphipod mats (sites C 6, and 28) in the project area. This is consistent with sediment core samples collected by Aqua Survey, Inc.

Soft sediment communities in the proposed project area were dominated by several burrowing and tube dwelling polychaetes, amphipods, tunicates and anemones. In general, shell hash (Mercenaria mercenaria, other clam species, Crepidula sp. and Ensis directis) varied in abundance within the project area. Based on video observation, no live individuals of shellfish (hard clams, surf clams and oysters) were observed, which suggests a low density of shellfish occur in this area. However, at several locations within C sites burrows were observed. These burrows are most likely used by lobsters, other invertebrates (i.e. the mud shrimp, Axius serratus) and fish species in the area.

The greatest differences in species number and diversity were between the soft sediment community (the majority of the proposed project area) compared to the community inhabiting the rock mounds (sites MG2, MG3 and MG4). The following descriptions of the benthic video sites are grouped by sediment type, number of organisms and species diversity (number of different types of organisms) observed in the video.

<u>Basin Mud Community (Stations C-1, 2 , 3, 4, 6,19,21, 22, 23, 24, 26, 27, 28)</u>
These stations are located at the eastern and western edges of the proposed project area within the western and central basins. The seafloor is flat at these locations. Bottom substrates are comprised of fine silt and sand and a patchy distribution of clay. The vibracore sediment samples collected by Aqua Survey, Inc. verified existing sediment mapping classified as sandy silt, clayey silt or silt. The eleven analyzed stations were similar in abundance of burrowing anemones and of worm tubes and the occasional presence of the tunicate, Molgula sp. The mud tubes are comprised of mud and mucous. They do not resemble the tubes created by the junk worm and cone worm, Pectinaria gouldi. Shrimp, amphipods and a few solitary hydroids were present at these stations. Burrows were also observed. These burrows are most likely used by lobsters, other invertebrates (i.e. the mud shrimp, Axius serratus) and fish species in the area. Shell debris is sparse at these stations.

Broadwater Benthic Video Summary – June 2005

The Western Transition Community (Stations IC-5, 6, and 7)
The IC stations are located towards the western end of the project area along the transition from the western basin floor to the Stratford Shoal. The bottom sediment observed in the underwater video is composed of fine grain silt which is similar to the existing sediment mapping classifications. Overall, fewer species were observed at these stations than the stations described above. Worm tubes and anemones are present. Marine particles in the water column made it difficult to accurately identify and view the benthic community at these stations.

The Eastern Transition Community (Stations C-13, 14, 15, 16 and 17)
These stations are located in the middle of the proposed project area along the transition from the Stratford Shoal to the Central basin floor. Bottom sediments are comprised of silt and sand. Polychaete worm tubes, burrowing anemones and tunicates are present in the greatest numbers. Colonial hydroids are present on shell debris and solitary hydroids are scattered throughout each area.

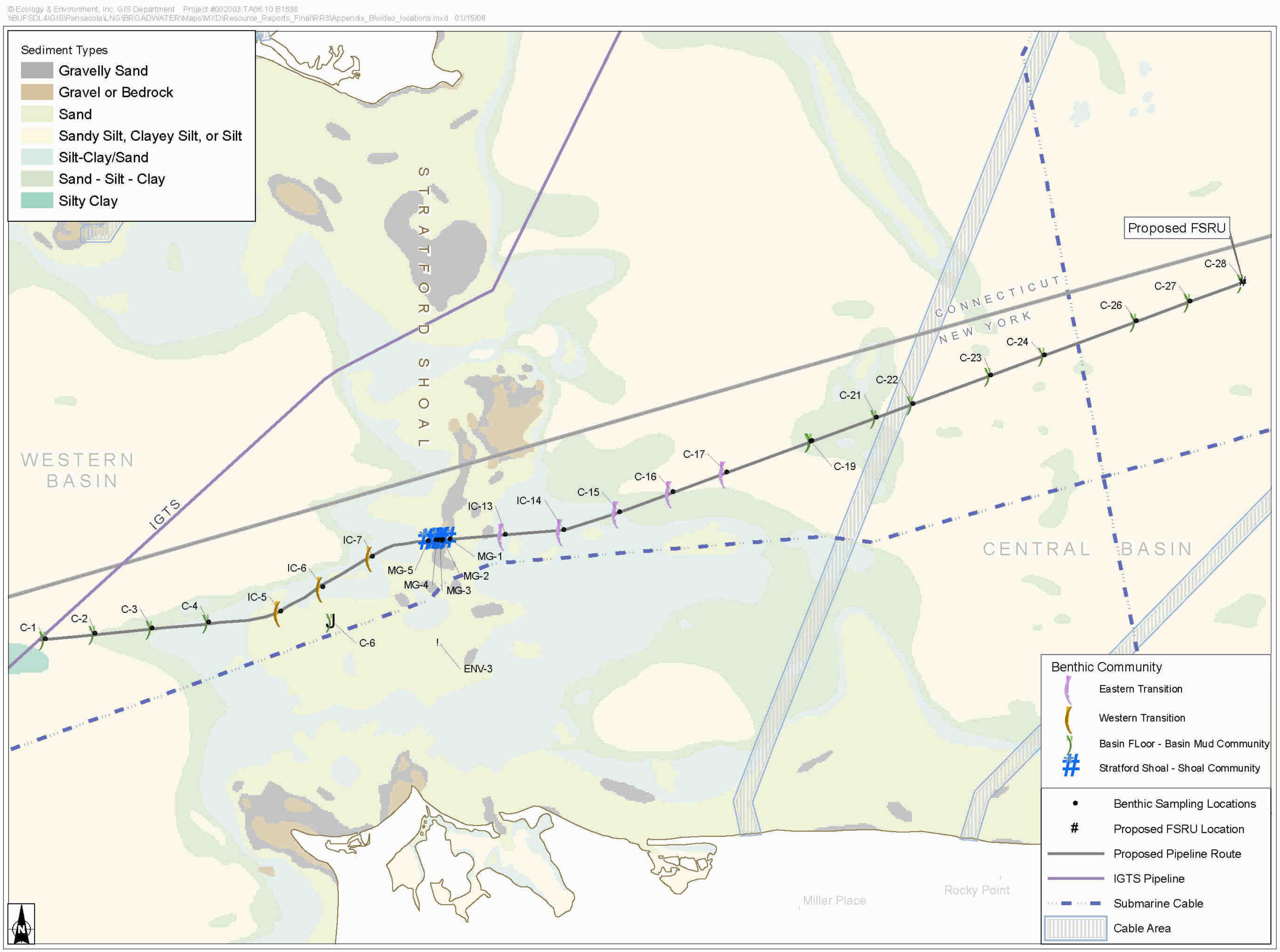
Shoal Community
Stations MG-1, 2 and 3 are located at the Stratford Shoal. Sediment samples collected using a Vibracore classified the bottom sediments found in this area as gravely sand and bedrock. The benthic community found in the sediment at these sites is diverse and complex. Bivalves are present but it is difficult to tell whether the animals are living or the shells are filled with mud. The shell hash is comprised of Mercenaria mercenaria, other clam species, Crepidula sp. and Ensis directis. The bottom sediment is covered by colonies of hydroids and amphipod mats. A spider crab and whelk were observed. Motile organisms at these stations include shrimp and amphipods.

Station ENV -3
The bottom sediment is classified as sandy silt at this location. The benthic community is similar to the rest of the project area with the addition of several species. There is some bottom relief in this area due to shell hash mounds. Horseshoe crabs and two species of fish, one in the Family Gadidae, possibly a four beard rockling, and an unidentified juvenile flatfish, were observed at this site.

IGTS Drift Over
There is some sediment relief and areas of disturbance along this site. The bottom sediments are comprised of silt and sand. Shell hash presence varies from absence to shell mounds. Burrow holes were present but it was difficult to determine if there were animals present. Overall, this station is similar to the other western stations.

References:

Wildish, David and D. Kristmanson. 1997. Benthic Suspension Feeders and Flow. Cambridge University Press:NY.



Source: U.S. Geological Survey Open-File Report OFR 00-304, 2000;
Broadwater Surveys conducted in April/May 2005.

Figure 1 Broadwater Video Locations Based on Spring 2005 Field Surveys

BW000376

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Acoustic Doppler Current Profiler Data

AQUA SURVEY, INC.
ADCP
Hourly Bottom Temperatures And Depths
E & E Broadwater

Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
8	5	4	29	15	6.77	32.63
14	5	4	29	16	5.89	32.84
20	5	4	29	17	5.53	32.76
26	5	4	29	18	5.46	32.48
32	5	4	29	19	5.43	32.07
38	5	4	29	20	5.43	31.62
44	5	4	29	21	5.44	31.29
50	5	4	29	22	5.44	31.13
56	5	4	29	23	5.43	31.18
62	5	4	30	0	5.44	31.44
68	5	4	30	1	5.45	31.89
74	5	4	30	2	5.48	32.38
80	5	4	30	3	5.50	32.80
86	5	4	30	4	5.49	33.07
92	5	4	30	5	5.50	33.04
98	5	4	30	6	5.52	32.76
104	5	4	30	7	5.53	32.36
110	5	4	30	8	5.54	31.87
116	5	4	30	9	5.54	31.40
122	5	4	30	10	5.52	31.08
128	5	4	30	11	5.50	30.91
134	5	4	30	12	5.48	31.04
140	5	4	30	13	5.47	31.37
146	5	4	30	14	5.50	31.86
152	5	4	30	15	5.53	32.36
158	5	4	30	16	5.55	32.72
164	5	4	30	17	5.56	32.89
170	5	4	30	18	5.57	32.80
176	5	4	30	19	5.59	32.51
182	5	4	30	20	5.58	32.12
188	5	4	30	21	5.58	31.69
194	5	4	30	22	5.57	31.33
200	5	4	30	23	5.55	31.16
206	5	5	1	0	5.54	31.19
212	5	5	1	1	5.53	31.45
218	5	5	1	2	5.56	31.83
224	5	5	1	3	5.58	32.30
230	5	5	1	4	5.59	32.68
236	5	5	1	5	5.59	32.90

AQUA SURVEY, INC.
ADCP
Hourly Bottom Temperatures And Depths
E & E Broadwater

Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
242	5	5	1	6	5.59	32.89
248	5	5	1	7	5.59	32.65
254	5	5	1	8	5.58	32.28
260	5	5	1	9	5.57	31.79
266	5	5	1	10	5.57	31.35
272	5	5	1	11	5.57	31.02
278	5	5	1	12	5.55	30.88
284	5	5	1	13	5.56	30.95
290	5	5	1	14	5.57	31.29
296	5	5	1	15	5.58	31.74
302	5	5	1	16	5.60	32.24
308	5	5	1	17	5.62	32.62
314	5	5	1	18	5.63	32.82
320	5	5	1	19	5.63	32.76
326	5	5	1	20	5.62	32.47
332	5	5	1	21	5.62	32.10
338	5	5	1	22	5.61	31.65
344	5	5	1	23	5.61	31.28
350	5	5	2	0	5.61	31.07
356	5	5	2	1	5.60	31.06
362	5	5	2	2	5.60	31.26
368	5	5	2	3	5.61	31.65
374	5	5	2	4	5.63	32.13
380	5	5	2	5	5.66	32.54
386	5	5	2	6	5.67	32.84
392	5	5	2	7	5.67	32.90
398	5	5	2	8	5.67	32.71
404	5	5	2	9	5.66	32.37
410	5	5	2	10	5.66	31.92
416	5	5	2	11	5.65	31.45
422	5	5	2	12	5.65	31.12
428	5	5	2	13	5.65	30.91
434	5	5	2	14	5.65	31.00
440	5	5	2	15	5.66	31.32
446	5	5	2	16	5.69	31.79
452	5	5	2	17	5.73	32.30
458	5	5	2	18	5.76	32.66
464	5	5	2	19	5.79	32.89
470	5	5	2	20	5.78	32.86

AQUA SURVEY, INC.
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Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
476	5	5	2	21	5.77	32.56
482	5	5	2	22	5.77	32.19
488	5	5	2	23	5.76	31.69
494	5	5	3	0	5.75	31.27
500	5	5	3	1	5.75	31.01
506	5	5	3	2	5.74	30.91
512	5	5	3	3	5.74	31.10
518	5	5	3	4	5.75	31.53
524	5	5	3	5	5.76	32.04
530	5	5	3	6	5.75	32.51
536	5	5	3	7	5.76	32.85
542	5	5	3	8	5.77	32.93
548	5	5	3	9	5.77	32.75
554	5	5	3	10	5.76	32.40
560	5	5	3	11	5.77	31.94
566	5	5	3	12	5.77	31.48
572	5	5	3	13	5.78	31.12
578	5	5	3	14	5.77	30.91
584	5	5	3	15	5.77	30.98
590	5	5	3	16	5.77	31.31
596	5	5	3	17	5.78	31.82
602	5	5	3	18	5.82	32.37
608	5	5	3	19	5.85	32.79
614	5	5	3	20	5.88	33.07
620	5	5	3	21	5.87	33.04
626	5	5	3	22	5.87	32.74
632	5	5	3	23	5.85	32.29
638	5	5	4	0	5.84	31.77
644	5	5	4	1	5.82	31.31
650	5	5	4	2	5.82	31.01
656	5	5	4	3	5.81	30.91
662	5	5	4	4	5.81	31.11
668	5	5	4	5	5.82	31.51
674	5	5	4	6	5.86	32.06
680	5	5	4	7	5.87	32.56
686	5	5	4	8	5.89	32.92
692	5	5	4	9	5.89	33.02
698	5	5	4	10	5.89	32.83
704	5	5	4	11	5.91	32.46

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Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
710	5	5	4	12	5.92	31.97
716	5	5	4	13	5.92	31.46
722	5	5	4	14	5.92	31.10
728	5	5	4	15	5.90	30.91
734	5	5	4	16	5.89	31.03
740	5	5	4	17	5.89	31.41
746	5	5	4	18	5.91	31.95
752	5	5	4	19	5.93	32.50
758	5	5	4	20	5.96	32.95
764	5	5	4	21	5.99	33.19
770	5	5	4	22	5.99	33.13
776	5	5	4	23	5.98	32.77
782	5	5	5	0	5.98	32.29
788	5	5	5	1	5.97	31.73
794	5	5	5	2	5.97	31.23
800	5	5	5	3	5.97	30.92
806	5	5	5	4	5.97	30.80
812	5	5	5	5	5.96	31.07
818	5	5	5	6	5.97	31.51
824	5	5	5	7	5.99	32.08
830	5	5	5	8	6.02	32.58
836	5	5	5	9	6.04	32.93
842	5	5	5	10	6.04	33.01
848	5	5	5	11	6.04	32.78
854	5	5	5	12	6.06	32.38
860	5	5	5	13	6.05	31.85
866	5	5	5	14	6.04	31.35
872	5	5	5	15	6.04	31.01
878	5	5	5	16	6.02	30.86
884	5	5	5	17	6.01	31.06
890	5	5	5	18	6.03	31.50
896	5	5	5	19	6.07	32.07
902	5	5	5	20	6.12	32.63
908	5	5	5	21	6.15	33.08
914	5	5	5	22	6.16	33.26
920	5	5	5	23	6.17	33.11
926	5	5	6	0	6.18	32.70
932	5	5	6	1	6.18	32.18
938	5	5	6	2	6.14	31.59

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Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
944	5	5	6	3	6.12	31.13
950	5	5	6	4	6.10	30.76
956	5	5	6	5	6.08	30.70
962	5	5	6	6	6.09	31.08
968	5	5	6	7	6.11	31.58
974	5	5	6	8	6.16	32.18
980	5	5	6	9	6.20	32.67
986	5	5	6	10	6.20	33.01
992	5	5	6	11	6.20	33.04
998	5	5	6	12	6.21	32.77
1004	5	5	6	13	6.23	32.38
1010	5	5	6	14	6.23	31.84
1016	5	5	6	15	6.20	31.37
1022	5	5	6	16	6.19	31.08
1028	5	5	6	17	6.19	31.01
1034	5	5	6	18	6.19	31.29
1040	5	5	6	19	6.18	31.80
1046	5	5	6	20	6.17	32.40
1052	5	5	6	21	6.20	32.91
1058	5	5	6	22	6.21	33.31
1064	5	5	6	23	6.21	33.38
1070	5	5	7	0	6.23	33.17
1076	5	5	7	1	6.30	32.73
1082	5	5	7	2	6.39	32.18
1088	5	5	7	3	6.46	31.61
1094	5	5	7	4	6.53	31.16
1100	5	5	7	5	6.62	30.89
1106	5	5	7	6	6.73	30.97
1112	5	5	7	7	6.74	31.31
1118	5	5	7	8	6.62	31.87
1124	5	5	7	9	6.60	32.47
1130	5	5	7	10	6.55	32.90
1136	5	5	7	11	6.58	33.13
1142	5	5	7	12	6.58	33.02
1148	5	5	7	13	6.59	32.67
1154	5	5	7	14	6.68	32.22
1160	5	5	7	15	6.78	31.68
1166	5	5	7	16	6.87	31.25
1172	5	5	7	17	6.97	30.94

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1178	5	5	7	18	7.10	30.85
1184	5	5	7	19	7.15	31.20
1190	5	5	7	20	7.00	31.71
1196	5	5	7	21	6.89	32.32
1202	5	5	7	22	6.81	32.82
1208	5	5	7	23	6.78	33.13
1214	5	5	8	0	6.75	33.11
1220	5	5	8	1	6.73	32.81
1226	5	5	8	2	6.76	32.38
1232	5	5	8	3	6.82	31.82
1238	5	5	8	4	6.90	31.30
1244	5	5	8	5	6.96	30.86
1250	5	5	8	6	7.11	30.67
1256	5	5	8	7	7.25	30.85
1262	5	5	8	8	7.31	31.32
1268	5	5	8	9	7.01	31.88
1274	5	5	8	10	6.95	32.47
1280	5	5	8	11	6.86	32.86
1286	5	5	8	12	6.82	33.00
1292	5	5	8	13	6.81	32.86
1298	5	5	8	14	6.80	32.52
1304	5	5	8	15	6.84	32.05
1310	5	5	8	16	6.85	31.55
1316	5	5	8	17	6.94	31.16
1322	5	5	8	18	6.99	30.97
1328	5	5	8	19	7.06	31.09
1334	5	5	8	20	7.11	31.50
1340	5	5	8	21	7.00	32.08
1346	5	5	8	22	6.93	32.67
1352	5	5	8	23	6.91	33.14
1358	5	5	9	0	6.91	33.34
1364	5	5	9	1	6.91	33.24
1370	5	5	9	2	6.95	32.88
1376	5	5	9	3	6.97	32.40
1382	5	5	9	4	6.95	31.82
1388	5	5	9	5	6.95	31.34
1394	5	5	9	6	7.04	30.99
1400	5	5	9	7	7.18	30.82
1406	5	5	9	8	7.27	31.11

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1412	5	5	9	9	7.13	31.54
1418	5	5	9	10	7.08	32.13
1424	5	5	9	11	7.04	32.64
1430	5	5	9	12	7.10	32.96
1436	5	5	9	13	7.07	33.01
1442	5	5	9	14	7.07	32.77
1448	5	5	9	15	7.08	32.38
1454	5	5	9	16	7.11	31.88
1460	5	5	9	17	7.10	31.41
1466	5	5	9	18	7.09	31.10
1472	5	5	9	19	7.08	31.05
1478	5	5	9	20	7.09	31.29
1484	5	5	9	21	7.08	31.73
1490	5	5	9	22	7.09	32.30
1496	5	5	9	23	7.12	32.81
1502	5	5	10	0	7.18	33.20
1508	5	5	10	1	7.21	33.32
1514	5	5	10	2	7.26	33.13
1520	5	5	10	3	7.25	32.71
1526	5	5	10	4	7.21	32.20
1532	5	5	10	5	7.20	31.64
1538	5	5	10	6	7.17	31.21
1544	5	5	10	7	7.20	30.94
1550	5	5	10	8	7.30	30.95
1556	5	5	10	9	7.33	31.26
1562	5	5	10	10	7.29	31.70
1568	5	5	10	11	7.27	32.24
1574	5	5	10	12	7.30	32.66
1580	5	5	10	13	7.31	32.90
1586	5	5	10	14	7.34	32.87
1592	5	5	10	15	7.38	32.63
1598	5	5	10	16	7.41	32.20
1604	5	5	10	17	7.35	31.71
1610	5	5	10	18	7.32	31.31
1616	5	5	10	19	7.30	31.08
1622	5	5	10	20	7.30	31.09
1628	5	5	10	21	7.32	31.38
1634	5	5	10	22	7.31	31.81
1640	5	5	10	23	7.37	32.33

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Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1646	5	5	11	0	7.42	32.76
1652	5	5	11	1	7.43	33.03
1658	5	5	11	2	7.44	33.05
1664	5	5	11	3	7.46	32.78
1670	5	5	11	4	7.45	32.38
1676	5	5	11	5	7.43	31.87
1682	5	5	11	6	7.41	31.39
1688	5	5	11	7	7.39	31.04
1694	5	5	11	8	7.42	30.79
1700	5	5	11	9	7.47	30.92
1706	5	5	11	10	7.46	31.29
1712	5	5	11	11	7.44	31.76
1718	5	5	11	12	7.49	32.26
1724	5	5	11	13	7.53	32.64
1730	5	5	11	14	7.55	32.79
1736	5	5	11	15	7.55	32.70
1742	5	5	11	16	7.56	32.41
1748	5	5	11	17	7.56	31.99
1754	5	5	11	18	7.54	31.53
1760	5	5	11	19	7.54	31.21
1766	5	5	11	20	7.51	31.08
1772	5	5	11	21	7.49	31.19
1778	5	5	11	22	7.50	31.48
1784	5	5	11	23	7.53	31.90
1790	5	5	12	0	7.57	32.36
1796	5	5	12	1	7.62	32.71
1802	5	5	12	2	7.64	32.90
1808	5	5	12	3	7.62	32.85
1814	5	5	12	4	7.60	32.58
1820	5	5	12	5	7.57	32.15
1826	5	5	12	6	7.54	31.65
1832	5	5	12	7	7.54	31.24
1838	5	5	12	8	7.56	30.95
1844	5	5	12	9	7.56	30.82
1850	5	5	12	10	7.57	31.09
1856	5	5	12	11	7.57	31.45
1862	5	5	12	12	7.58	31.90
1868	5	5	12	13	7.61	32.35
1874	5	5	12	14	7.66	32.65

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1880	5	5	12	15	7.67	32.72
1886	5	5	12	16	7.66	32.60
1892	5	5	12	17	7.62	32.30
1898	5	5	12	18	7.58	31.91
1904	5	5	12	19	7.57	31.55
1910	5	5	12	20	7.56	31.27
1916	5	5	12	21	7.57	31.20
1922	5	5	12	22	7.57	31.36
1928	5	5	12	23	7.60	31.66
1934	5	5	13	0	7.65	32.08
1940	5	5	13	1	7.72	32.51
1946	5	5	13	2	7.74	32.80
1952	5	5	13	3	7.75	32.94
1958	5	5	13	4	7.73	32.81
1964	5	5	13	5	7.68	32.51
1970	5	5	13	6	7.64	32.10
1976	5	5	13	7	7.61	31.65
1982	5	5	13	8	7.60	31.28
1988	5	5	13	9	7.60	31.03
1994	5	5	13	10	7.60	31.02
2000	5	5	13	11	7.60	31.24
2006	5	5	13	12	7.62	31.59
2012	5	5	13	13	7.64	32.03
2018	5	5	13	14	7.70	32.42
2024	5	5	13	15	7.72	32.65
2030	5	5	13	16	7.73	32.67
2036	5	5	13	17	7.73	32.50
2042	5	5	13	18	7.71	32.17
2048	5	5	13	19	7.69	31.78
2054	5	5	13	20	7.68	31.41
2060	5	5	13	21	7.69	31.19
2066	5	5	13	22	7.69	31.13
2072	5	5	13	23	7.70	31.26
2078	5	5	14	0	7.72	31.52
2084	5	5	14	1	7.74	31.88
2090	5	5	14	2	7.76	32.23
2096	5	5	14	3	7.79	32.51
2102	5	5	14	4	7.80	32.60
2108	5	5	14	5	7.79	32.49

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2114	5	5	14	6	7.78	32.20
2120	5	5	14	7	7.79	31.84
2126	5	5	14	8	7.79	31.47
2132	5	5	14	9	7.80	31.17
2138	5	5	14	10	7.79	30.98
2144	5	5	14	11	7.78	31.07
2150	5	5	14	12	7.77	31.31
2156	5	5	14	13	7.80	31.65
2162	5	5	14	14	7.84	32.06
2168	5	5	14	15	7.88	32.42
2174	5	5	14	16	7.90	32.62
2180	5	5	14	17	7.90	32.64
2186	5	5	14	18	7.88	32.44
2192	5	5	14	19	7.87	32.13
2198	5	5	14	20	7.86	31.77
2204	5	5	14	21	7.86	31.46
2210	5	5	14	22	7.85	31.26
2216	5	5	14	23	7.85	31.25
2222	5	5	15	0	7.86	31.42
2228	5	5	15	1	7.89	31.73
2234	5	5	15	2	7.93	32.09
2240	5	5	15	3	7.96	32.45
2246	5	5	15	4	8.00	32.66
2252	5	5	15	5	8.00	32.70
2258	5	5	15	6	7.99	32.56
2264	5	5	15	7	7.96	32.27
2270	5	5	15	8	7.92	31.92
2276	5	5	15	9	7.90	31.55
2282	5	5	15	10	7.88	31.28
2288	5	5	15	11	7.88	31.15
2294	5	5	15	12	7.89	31.23
2300	5	5	15	13	7.91	31.49
2306	5	5	15	14	7.95	31.84
2312	5	5	15	15	8.00	32.23
2318	5	5	15	16	8.06	32.54
2324	5	5	15	17	8.08	32.71
2330	5	5	15	18	8.09	32.67
2336	5	5	15	19	8.06	32.46
2342	5	5	15	20	8.02	32.14

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2348	5	5	15	21	7.98	31.78
2354	5	5	15	22	7.95	31.47
2360	5	5	15	23	7.94	31.30
2366	5	5	16	0	7.95	31.31
2372	5	5	16	1	7.97	31.53
2378	5	5	16	2	8.00	31.81
2384	5	5	16	3	8.05	32.18
2390	5	5	16	4	8.10	32.54
2396	5	5	16	5	8.12	32.73
2402	5	5	16	6	8.09	32.76
2408	5	5	16	7	8.05	32.60
2414	5	5	16	8	8.00	32.30
2420	5	5	16	9	7.95	31.93
2426	5	5	16	10	7.92	31.59
2432	5	5	16	11	7.91	31.32
2438	5	5	16	12	7.91	31.20
2444	5	5	16	13	7.91	31.27
2450	5	5	16	14	7.92	31.53
2456	5	5	16	15	7.95	31.88
2462	5	5	16	16	8.00	32.26
2468	5	5	16	17	8.05	32.57
2474	5	5	16	18	8.06	32.72
2480	5	5	16	19	8.04	32.67
2486	5	5	16	20	7.99	32.46
2492	5	5	16	21	7.92	32.13
2498	5	5	16	22	7.90	31.76
2504	5	5	16	23	7.90	31.45
2510	5	5	17	0	7.90	31.28
2516	5	5	17	1	7.89	31.28
2522	5	5	17	2	7.89	31.44
2528	5	5	17	3	7.91	31.73
2534	5	5	17	4	7.94	32.08
2540	5	5	17	5	7.98	32.40
2546	5	5	17	6	8.01	32.61
2552	5	5	17	7	7.99	32.65
2558	5	5	17	8	7.96	32.49
2564	5	5	17	9	7.93	32.21
2570	5	5	17	10	7.91	31.86
2576	5	5	17	11	7.90	31.53

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2582	5	5	17	12	7.89	31.28
2588	5	5	17	13	7.90	31.20
2594	5	5	17	14	7.91	31.31
2600	5	5	17	15	7.93	31.60
2606	5	5	17	16	7.96	31.97
2612	5	5	17	17	8.01	32.35
2618	5	5	17	18	8.06	32.65
2624	5	5	17	19	8.07	32.76
2630	5	5	17	20	8.07	32.71
2636	5	5	17	21	8.04	32.46
2642	5	5	17	22	8.00	32.10
2648	5	5	17	23	7.97	31.71
2654	5	5	18	0	7.96	31.38
2660	5	5	18	1	7.96	31.19
2666	5	5	18	2	7.98	31.19
2672	5	5	18	3	8.00	31.39
2678	5	5	18	4	8.01	31.73
2684	5	5	18	5	8.02	32.12
2690	5	5	18	6	8.04	32.46
2696	5	5	18	7	8.05	32.66
2702	5	5	18	8	8.05	32.65
2708	5	5	18	9	8.04	32.47
2714	5	5	18	10	8.04	32.15
2720	5	5	18	11	8.04	31.78
2726	5	5	18	12	8.03	31.43
2732	5	5	18	13	8.03	31.19
2738	5	5	18	14	8.03	31.12
2744	5	5	18	15	8.03	31.28
2750	5	5	18	16	8.05	31.61
2756	5	5	18	17	8.07	32.03
2762	5	5	18	18	8.10	32.44
2768	5	5	18	19	8.15	32.73
2774	5	5	18	20	8.18	32.85
2780	5	5	18	21	8.18	32.77
2786	5	5	18	22	8.14	32.50
2792	5	5	18	23	8.11	32.09
2798	5	5	19	0	8.09	31.66
2804	5	5	19	1	8.08	31.30
2810	5	5	19	2	8.08	31.10

AQUA SURVEY, INC.
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Station C-1
4/29 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2816	5	5	19	3	8.09	31.12
2822	5	5	19	4	8.11	31.36
2828	5	5	19	5	8.13	31.73
2834	5	5	19	6	8.16	32.15
2840	5	5	19	7	8.20	32.50
2846	5	5	19	8	8.22	32.69
2852	5	5	19	9	8.22	32.68
2858	5	5	19	10	8.20	32.44
2864	5	5	19	11	8.18	32.09
2870	5	5	19	12	8.16	31.68
2876	5	5	19	13	8.16	31.32
2882	5	5	19	14	8.15	31.09
2888	5	5	19	15	8.16	31.05
2894	5	5	19	16	8.17	31.29
2900	5	5	19	17	8.21	31.68
2906	5	5	19	18	8.26	32.17
2912	5	5	19	19	8.29	32.61
2918	5	5	19	20	8.32	32.88
2924	5	5	19	21	8.33	32.96
2930	5	5	19	22	8.31	32.76
2936	5	5	19	23	8.29	32.41
2942	5	5	20	0	8.27	31.92
2948	5	5	20	1	8.26	31.44
2954	5	5	20	2	8.25	31.07
2960	5	5	20	3	8.24	30.83
2966	5	5	20	4	8.24	30.91
2972	5	5	20	5	8.24	31.29
2978	5	5	20	6	8.25	31.73
2984	5	5	20	7	8.32	32.21
2990	5	5	20	8	8.38	32.60
2996	5	5	20	9	8.39	32.79
3002	5	5	20	10	8.40	32.76
3008	5	5	20	11	8.38	32.50
3014	5	5	20	12	8.35	32.09
3020	5	5	20	13	8.32	31.63
3026	5	5	20	14	8.30	31.25
3032	5	5	20	15	8.30	30.95
3038	5	5	20	16	8.31	30.99
3044	5	5	20	17	8.34	31.33

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3050	5	5	20	18	8.38	31.75
3056	5	5	20	19	8.45	32.25
3062	5	5	20	20	8.47	32.71
3068	5	5	20	21	8.48	32.99
3074	5	5	20	22	8.48	33.02
3080	5	5	20	23	8.48	32.79
3086	5	5	21	0	8.45	32.38
3092	5	5	21	1	8.41	31.86
3098	5	5	21	2	8.37	31.36
3104	5	5	21	3	8.37	30.92
3110	5	5	21	4	8.37	30.76
3116	5	5	21	5	8.34	30.88
3122	5	5	21	6	8.34	31.37
3128	5	5	21	7	8.42	31.90
3134	5	5	21	8	8.47	32.44
3140	5	5	21	9	8.48	32.81
3146	5	5	21	10	8.49	32.96
3152	5	5	21	11	8.48	32.86
3158	5	5	21	12	8.48	32.57
3164	5	5	21	13	8.46	32.13
3170	5	5	21	14	8.45	31.67
3176	5	5	21	15	8.43	31.28
3182	5	5	21	16	8.44	31.06
3188	5	5	21	17	8.44	31.17
3194	5	5	21	18	8.45	31.52
3200	5	5	21	19	8.50	32.04
3206	5	5	21	20	8.56	32.61
3212	5	5	21	21	8.60	33.05
3218	5	5	21	22	8.61	33.24
3224	5	5	21	23	8.61	33.16
3230	5	5	22	0	8.58	32.79
3236	5	5	22	1	8.56	32.30
3242	5	5	22	2	8.54	31.71
3248	5	5	22	3	8.53	31.20
3254	5	5	22	4	8.51	30.78
3260	5	5	22	5	8.49	30.67
3266	5	5	22	6	8.47	30.87
3272	5	5	22	7	8.46	31.40
3278	5	5	22	8	8.49	31.97

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3284	5	5	22	9	8.52	32.50
3290	5	5	22	10	8.56	32.85
3296	5	5	22	11	8.57	32.95
3302	5	5	22	12	8.57	32.78
3308	5	5	22	13	8.57	32.39
3314	5	5	22	14	8.57	31.87
3320	5	5	22	15	8.57	31.37
3326	5	5	22	16	8.58	30.94
3332	5	5	22	17	8.58	30.80
3338	5	5	22	18	8.55	31.02
3344	5	5	22	19	8.54	31.51
3350	5	5	22	20	8.62	32.08
3356	5	5	22	21	8.70	32.66
3362	5	5	22	22	8.76	33.05
3368	5	5	22	23	8.76	33.23
3374	5	5	23	0	8.75	33.06
3380	5	5	23	1	8.73	32.67
3386	5	5	23	2	8.69	32.12
3392	5	5	23	3	8.64	31.54
3398	5	5	23	4	8.61	30.96
3404	5	5	23	5	8.58	30.64
3410	5	5	23	6	8.57	30.59
3416	5	5	23	7	8.57	30.88
3422	5	5	23	8	8.59	31.45
3428	5	5	23	9	8.61	32.06
3434	5	5	23	10	8.64	32.57
3440	5	5	23	11	8.66	32.87
3446	5	5	23	12	8.67	32.92
3452	5	5	23	13	8.70	32.69
3458	5	5	23	14	8.72	32.26
3464	5	5	23	15	8.75	31.72
3470	5	5	23	16	8.76	31.23
3476	5	5	23	17	8.77	30.86
3482	5	5	23	18	8.74	30.82
3488	5	5	23	19	8.71	31.19
3494	5	5	23	20	8.71	31.71
3500	5	5	23	21	8.73	32.34
3506	5	5	23	22	8.78	32.90
3512	5	5	23	23	8.82	33.30

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3518	5	5	24	0	8.81	33.40
3524	5	5	24	1	8.77	33.15
3530	5	5	24	2	8.73	32.70
3536	5	5	24	3	8.75	32.09
3542	5	5	24	4	8.74	31.50
3548	5	5	24	5	8.75	30.98
3554	5	5	24	6	8.74	30.71
3560	5	5	24	7	8.72	30.76
3566	5	5	24	8	8.70	31.20
3572	5	5	24	9	8.71	31.75
3578	5	5	24	10	8.73	32.36
3584	5	5	24	11	8.77	32.83
3590	5	5	24	12	8.81	33.09
3596	5	5	24	13	8.83	33.04
3602	5	5	24	14	8.86	32.77
3608	5	5	24	15	8.86	32.29
3614	5	5	24	16	8.87	31.76
3620	5	5	24	17	8.86	31.35
3626	5	5	24	18	8.86	31.00
3632	5	5	24	19	8.84	31.03
3638	5	5	24	20	8.82	31.48
3644	5	5	24	21	8.82	32.03
3650	5	5	24	22	8.85	32.65
3656	5	5	24	23	8.90	33.20
3662	5	5	25	0	8.93	33.51
3668	5	5	25	1	8.90	33.52
3674	5	5	25	2	8.88	33.19
3680	5	5	25	3	8.88	32.71
3686	5	5	25	4	8.89	32.16
3692	5	5	25	5	8.89	31.64
3698	5	5	25	6	8.89	31.22
3704	5	5	25	7	9.00	30.96
3710	5	5	25	8	9.15	31.20
3716	5	5	25	9	9.20	31.63
3722	5	5	25	10	9.01	32.21
3728	5	5	25	11	9.03	32.80
3734	5	5	25	12	8.95	33.18
3740	5	5	25	13	9.00	33.32
3746	5	5	25	14	8.94	33.15

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3752	5	5	25	15	8.98	32.76
3758	5	5	25	16	9.04	32.22
3764	5	5	25	17	9.11	31.69
3770	5	5	25	18	9.23	31.28
3776	5	5	25	19	9.33	30.97
3782	5	5	25	20	9.47	31.02
3788	5	5	25	21	9.50	31.49
3794	5	5	25	22	9.37	32.05
3800	5	5	25	23	9.31	32.67
3806	5	5	26	0	9.23	33.19
3812	5	5	26	1	9.19	33.51
3818	5	5	26	2	9.19	33.50
3824	5	5	26	3	9.24	33.24
3830	5	5	26	4	9.29	32.80
3836	5	5	26	5	9.24	32.25
3842	5	5	26	6	9.52	31.75
3848	5	5	26	7	9.90	31.33
3854	5	5	26	8	10.28	31.03
3860	5	5	26	9	10.44	31.10
3866	5	5	26	10	10.34	31.51
3872	5	5	26	11	9.85	31.97
3878	5	5	26	12	9.48	32.49
3884	5	5	26	13	9.45	32.85
3890	5	5	26	14	9.52	32.95
3896	5	5	26	15	9.55	32.80
3902	5	5	26	16	9.74	32.41
3908	5	5	26	17	10.16	31.91
3914	5	5	26	18	10.22	31.42
3920	5	5	26	19	10.30	30.98
3926	5	5	26	20	10.32	30.83
3932	5	5	26	21	10.32	30.98
3938	5	5	26	22	10.22	31.53
3944	5	5	26	23	9.80	32.09
3950	5	5	27	0	9.68	32.69
3956	5	5	27	1	9.72	33.15
3962	5	5	27	2	9.74	33.35
3968	5	5	27	3	9.78	33.25
3974	5	5	27	4	9.82	32.90
3980	5	5	27	5	9.84	32.34

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3986	5	5	27	6	10.01	31.75
3992	5	5	27	7	10.03	31.18
3998	5	5	27	8	10.07	30.77
4004	5	5	27	9	10.16	30.62
4010	5	5	27	10	10.18	30.78
4016	5	5	27	11	10.03	31.25
4022	5	5	27	12	9.92	31.86
4028	5	5	27	13	9.88	32.42
4034	5	5	27	14	9.88	32.82
4040	5	5	27	15	9.91	32.94
4046	5	5	27	16	9.93	32.79
4052	5	5	27	17	9.95	32.41
4058	5	5	27	18	9.98	31.92
4064	5	5	27	19	10.01	31.47
4070	5	5	27	20	10.01	31.01
4076	5	5	27	21	10.01	30.85
4082	5	5	27	22	9.98	30.97
4088	5	5	27	23	9.95	31.45
4094	5	5	28	0	9.96	31.95
4100	5	5	28	1	10.02	32.50
4106	5	5	28	2	10.12	32.92
4112	5	5	28	3	10.14	33.12
4118	5	5	28	4	10.14	33.04
4124	5	5	28	5	10.11	32.73
4130	5	5	28	6	10.06	32.22
4136	5	5	28	7	10.05	31.66
4142	5	5	28	8	10.04	31.09
4148	5	5	28	9	10.04	30.74
4154	5	5	28	10	10.04	30.61
4160	5	5	28	11	10.02	30.82
4166	5	5	28	12	10.02	31.34
4172	5	5	28	13	10.05	31.90
4178	5	5	28	14	10.12	32.44
4184	5	5	28	15	10.17	32.82
4190	5	5	28	16	10.20	32.94
4196	5	5	28	17	10.19	32.77
4202	5	5	28	18	10.17	32.42
4208	5	5	28	19	10.13	31.93
4214	5	5	28	20	10.12	31.48

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4220	5	5	28	21	10.11	30.99
4226	5	5	28	22	10.10	30.84
4232	5	5	28	23	10.09	30.94
4238	5	5	29	0	10.11	31.33
4244	5	5	29	1	10.16	31.81
4250	5	5	29	2	10.26	32.36
4256	5	5	29	3	10.36	32.78
4262	5	5	29	4	10.39	33.02
4268	5	5	29	5	10.43	32.97
4274	5	5	29	6	10.42	32.65
4280	5	5	29	7	10.37	32.19
4286	5	5	29	8	10.29	31.65
4292	5	5	29	9	10.25	31.11
4298	5	5	29	10	10.23	30.77
4304	5	5	29	11	10.22	30.65
4310	5	5	29	12	10.24	30.85
4316	5	5	29	13	10.30	31.35
4322	5	5	29	14	10.38	31.88
4328	5	5	29	15	10.44	32.41
4334	5	5	29	16	10.44	32.79
4340	5	5	29	17	10.40	32.93
4346	5	5	29	18	10.39	32.79
4352	5	5	29	19	10.43	32.44
4358	5	5	29	20	10.46	31.99
4364	5	5	29	21	10.46	31.51
4370	5	5	29	22	10.45	31.06
4376	5	5	29	23	10.43	30.86
4382	5	5	30	0	10.44	30.90
4388	5	5	30	1	10.45	31.23
4394	5	5	30	2	10.39	31.76
4400	5	5	30	3	10.30	32.30
4406	5	5	30	4	10.27	32.73
4412	5	5	30	5	10.26	32.99
4418	5	5	30	6	10.26	32.95
4424	5	5	30	7	10.27	32.67
4430	5	5	30	8	10.28	32.23
4436	5	5	30	9	10.29	31.72
4442	5	5	30	10	10.30	31.19
4448	5	5	30	11	10.30	30.84

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4454	5	5	30	12	10.30	30.71
4460	5	5	30	13	10.28	30.91
4466	5	5	30	14	10.27	31.40
4472	5	5	30	15	10.27	31.91
4478	5	5	30	16	10.25	32.43
4484	5	5	30	17	10.24	32.82
4490	5	5	30	18	10.23	32.97
4496	5	5	30	19	10.23	32.84
4502	5	5	30	20	10.24	32.50
4508	5	5	30	21	10.25	32.04
4514	5	5	30	22	10.26	31.56
4520	5	5	30	23	10.27	31.09
4526	5	5	31	0	10.26	30.86
4532	5	5	31	1	10.25	30.86
4538	5	5	31	2	10.23	31.15
4544	5	5	31	3	10.23	31.68
4550	5	5	31	4	10.24	32.20
4556	5	5	31	5	10.27	32.65
4562	5	5	31	6	10.27	32.90
4568	5	5	31	7	10.27	32.90
4574	5	5	31	8	10.27	32.64
4580	5	5	31	9	10.28	32.23
4586	5	5	31	10	10.27	31.75
4592	5	5	31	11	10.26	31.28
4598	5	5	31	12	10.26	30.93
4604	5	5	31	13	10.25	30.82
4610	5	5	31	14	10.25	31.01
4616	5	5	31	15	10.26	31.52
4622	5	5	31	16	10.25	32.05
4628	5	5	31	17	10.26	32.56
4634	5	5	31	18	10.28	32.94
4640	5	5	31	19	10.30	33.06
4646	5	5	31	20	10.30	32.94
4652	5	5	31	21	10.30	32.60
4658	5	5	31	22	10.27	32.13
4664	5	5	31	23	10.27	31.63
4670	5	6	1	0	10.26	31.14
4676	5	6	1	1	10.27	30.86
4682	5	6	1	2	10.26	30.83

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Station C-1
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4688	5	6	1	3	10.26	31.10
4694	5	6	1	4	10.26	31.60
4700	5	6	1	5	10.28	32.13
4706	5	6	1	6	10.30	32.58
4712	5	6	1	7	10.32	32.85
4718	5	6	1	8	10.33	32.87
4724	5	6	1	9	10.32	32.62
4730	5	6	1	10	10.33	32.23
4736	5	6	1	11	10.31	31.76
4742	5	6	1	12	10.31	31.33
4748	5	6	1	13	10.31	30.95
4754	5	6	1	14	10.29	30.84
4760	5	6	1	15	10.28	31.07
4766	5	6	1	16	10.30	31.56
4772	5	6	1	17	10.35	32.09
4778	5	6	1	18	10.39	32.62
4784	5	6	1	19	10.42	32.98
4790	5	6	1	20	10.46	33.09
4796	5	6	1	21	10.46	32.96
4802	5	6	1	22	10.45	32.57
4808	5	6	1	23	10.44	32.05
4814	5	6	2	0	10.41	31.52
4820	5	6	2	1	10.40	31.02
4826	5	6	2	2	10.40	30.76
4832	5	6	2	3	10.35	30.74
4838	5	6	2	4	10.34	31.01
4844	5	6	2	5	10.39	31.54
4850	5	6	2	6	10.45	32.06
4856	5	6	2	7	10.46	32.52
4862	5	6	2	8	10.49	32.80
4868	5	6	2	9	10.49	32.80
4874	5	6	2	10	10.49	32.55
4880	5	6	2	11	10.48	32.15
4886	5	6	2	12	10.48	31.68
4892	5	6	2	13	10.48	31.17
4898	5	6	2	14	10.46	30.88

AQUA SURVEY, INC.
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Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
28	5	5	2	12	7.83	23.44
34	5	5	2	13	7.25	23.28
40	5	5	2	14	7.06	23.38
46	5	5	2	15	7.12	23.74
52	5	5	2	16	7.26	24.13
58	5	5	2	17	7.41	24.50
64	5	5	2	18	7.53	24.81
70	5	5	2	19	7.58	25.00
76	5	5	2	20	7.60	24.95
82	5	5	2	21	7.59	24.67
88	5	5	2	22	7.55	24.28
94	5	5	2	23	7.50	23.87
100	5	5	3	0	7.43	23.56
106	5	5	3	1	7.39	23.30
112	5	5	3	2	7.36	23.27
118	5	5	3	3	7.38	23.53
124	5	5	3	4	7.41	23.89
130	5	5	3	5	7.47	24.32
136	5	5	3	6	7.53	24.65
142	5	5	3	7	7.57	24.92
148	5	5	3	8	7.59	25.03
154	5	5	3	9	7.58	24.84
160	5	5	3	10	7.56	24.49
166	5	5	3	11	7.53	24.10
172	5	5	3	12	7.48	23.72
178	5	5	3	13	7.45	23.40
184	5	5	3	14	7.45	23.25
190	5	5	3	15	7.50	23.39
196	5	5	3	16	7.56	23.72
202	5	5	3	17	7.62	24.17
208	5	5	3	18	7.66	24.56
214	5	5	3	19	7.68	24.93
220	5	5	3	20	7.71	25.16
226	5	5	3	21	7.71	25.09
232	5	5	3	22	7.69	24.81
238	5	5	3	23	7.69	24.41
244	5	5	4	0	7.65	23.95
250	5	5	4	1	7.62	23.59
256	5	5	4	2	7.61	23.32

AQUA SURVEY, INC.
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Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
262	5	5	4	3	7.62	23.23
268	5	5	4	4	7.63	23.48
274	5	5	4	5	7.67	23.89
280	5	5	4	6	7.72	24.32
286	5	5	4	7	7.74	24.69
292	5	5	4	8	7.77	25.00
298	5	5	4	9	7.78	25.09
304	5	5	4	10	7.76	24.89
310	5	5	4	11	7.76	24.54
316	5	5	4	12	7.74	24.12
322	5	5	4	13	7.71	23.73
328	5	5	4	14	7.69	23.39
334	5	5	4	15	7.68	23.27
340	5	5	4	16	7.70	23.41
346	5	5	4	17	7.75	23.80
352	5	5	4	18	7.78	24.27
358	5	5	4	19	7.82	24.68
364	5	5	4	20	7.86	25.04
370	5	5	4	21	7.88	25.25
376	5	5	4	22	7.86	25.18
382	5	5	4	23	7.84	24.83
388	5	5	5	0	7.82	24.39
394	5	5	5	1	7.79	23.95
400	5	5	5	2	7.76	23.52
406	5	5	5	3	7.74	23.24
412	5	5	5	4	7.74	23.20
418	5	5	5	5	7.77	23.46
424	5	5	5	6	7.81	23.91
430	5	5	5	7	7.84	24.34
436	5	5	5	8	7.88	24.71
442	5	5	5	9	7.90	25.02
448	5	5	5	10	7.90	25.05
454	5	5	5	11	7.88	24.83
460	5	5	5	12	7.87	24.46
466	5	5	5	13	7.84	24.01
472	5	5	5	14	7.81	23.63
478	5	5	5	15	7.79	23.32
484	5	5	5	16	7.79	23.24
490	5	5	5	17	7.82	23.47

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
496	5	5	5	18	7.87	23.90
502	5	5	5	19	7.93	24.37
508	5	5	5	20	7.97	24.82
514	5	5	5	21	8.01	25.16
520	5	5	5	22	8.03	25.33
526	5	5	5	23	8.02	25.16
532	5	5	6	0	8.00	24.76
538	5	5	6	1	7.99	24.30
544	5	5	6	2	7.96	23.84
550	5	5	6	3	7.92	23.40
556	5	5	6	4	7.90	23.15
562	5	5	6	5	7.91	23.18
568	5	5	6	6	7.94	23.50
574	5	5	6	7	7.97	23.98
580	5	5	6	8	8.00	24.38
586	5	5	6	9	8.03	24.78
592	5	5	6	10	8.05	25.08
598	5	5	6	11	8.05	25.10
604	5	5	6	12	8.03	24.85
610	5	5	6	13	8.03	24.43
616	5	5	6	14	8.01	24.02
622	5	5	6	15	7.97	23.66
628	5	5	6	16	7.94	23.39
634	5	5	6	17	7.95	23.39
640	5	5	6	18	8.01	23.69
646	5	5	6	19	8.08	24.17
652	5	5	6	20	8.13	24.62
658	5	5	6	21	8.17	25.02
664	5	5	6	22	8.22	25.37
670	5	5	6	23	8.22	25.47
676	5	5	7	0	8.19	25.25
682	5	5	7	1	8.16	24.78
688	5	5	7	2	8.14	24.31
694	5	5	7	3	8.10	23.86
700	5	5	7	4	8.02	23.45
706	5	5	7	5	7.96	23.26
712	5	5	7	6	7.96	23.36
718	5	5	7	7	8.01	23.74
724	5	5	7	8	8.05	24.19

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
730	5	5	7	9	8.09	24.64
736	5	5	7	10	8.09	24.95
742	5	5	7	11	8.07	25.18
748	5	5	7	12	8.01	25.13
754	5	5	7	13	7.95	24.78
760	5	5	7	14	7.86	24.33
766	5	5	7	15	7.75	23.93
772	5	5	7	16	7.64	23.51
778	5	5	7	17	7.50	23.30
784	5	5	7	18	7.43	23.32
790	5	5	7	19	7.43	23.63
796	5	5	7	20	7.52	24.08
802	5	5	7	21	7.70	24.51
808	5	5	7	22	7.79	24.93
814	5	5	7	23	7.74	25.18
820	5	5	8	0	7.57	25.21
826	5	5	8	1	7.55	24.91
832	5	5	8	2	7.57	24.47
838	5	5	8	3	7.47	24.01
844	5	5	8	4	7.51	23.56
850	5	5	8	5	7.50	23.27
856	5	5	8	6	7.46	23.14
862	5	5	8	7	7.45	23.36
868	5	5	8	8	7.48	23.74
874	5	5	8	9	7.55	24.19
880	5	5	8	10	7.62	24.61
886	5	5	8	11	7.66	24.94
892	5	5	8	12	7.61	25.09
898	5	5	8	13	7.57	24.93
904	5	5	8	14	7.54	24.61
910	5	5	8	15	7.54	24.18
916	5	5	8	16	7.59	23.80
922	5	5	8	17	7.60	23.47
928	5	5	8	18	7.62	23.36
934	5	5	8	19	7.66	23.56
940	5	5	8	20	7.58	23.94
946	5	5	8	21	7.55	24.40
952	5	5	8	22	7.58	24.85
958	5	5	8	23	7.61	25.24

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
964	5	5	9	0	7.62	25.43
970	5	5	9	1	7.65	25.32
976	5	5	9	2	7.68	24.98
982	5	5	9	3	7.69	24.54
988	5	5	9	4	7.73	24.05
994	5	5	9	5	7.80	23.60
1000	5	5	9	6	7.80	23.34
1006	5	5	9	7	7.80	23.32
1012	5	5	9	8	7.67	23.58
1018	5	5	9	9	7.68	23.98
1024	5	5	9	10	7.70	24.39
1030	5	5	9	11	7.74	24.76
1036	5	5	9	12	7.75	25.06
1042	5	5	9	13	7.75	25.11
1048	5	5	9	14	7.75	24.85
1054	5	5	9	15	7.77	24.48
1060	5	5	9	16	7.80	24.07
1066	5	5	9	17	7.83	23.72
1072	5	5	9	18	7.85	23.46
1078	5	5	9	19	7.84	23.45
1084	5	5	9	20	7.77	23.72
1090	5	5	9	21	7.79	24.13
1096	5	5	9	22	7.85	24.59
1102	5	5	9	23	7.91	25.03
1108	5	5	10	0	7.98	25.31
1114	5	5	10	1	8.01	25.41
1120	5	5	10	2	8.02	25.23
1126	5	5	10	3	8.00	24.84
1132	5	5	10	4	7.98	24.38
1138	5	5	10	5	7.95	23.92
1144	5	5	10	6	7.95	23.51
1150	5	5	10	7	7.94	23.34
1156	5	5	10	8	7.91	23.38
1162	5	5	10	9	7.90	23.68
1168	5	5	10	10	7.91	24.10
1174	5	5	10	11	7.93	24.46
1180	5	5	10	12	7.96	24.79
1186	5	5	10	13	8.00	25.03
1192	5	5	10	14	8.01	25.01

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1198	5	5	10	15	8.00	24.72
1204	5	5	10	16	7.99	24.32
1210	5	5	10	17	7.98	23.95
1216	5	5	10	18	7.98	23.64
1222	5	5	10	19	7.98	23.46
1228	5	5	10	20	7.97	23.51
1234	5	5	10	21	7.97	23.78
1240	5	5	10	22	8.00	24.19
1246	5	5	10	23	8.05	24.61
1252	5	5	11	0	8.14	24.93
1258	5	5	11	1	8.21	25.18
1264	5	5	11	2	8.25	25.17
1270	5	5	11	3	8.22	24.90
1276	5	5	11	4	8.15	24.51
1282	5	5	11	5	8.08	24.09
1288	5	5	11	6	8.06	23.68
1294	5	5	11	7	8.04	23.36
1300	5	5	11	8	8.04	23.26
1306	5	5	11	9	8.03	23.41
1312	5	5	11	10	8.02	23.71
1318	5	5	11	11	8.04	24.08
1324	5	5	11	12	8.10	24.45
1330	5	5	11	13	8.18	24.79
1336	5	5	11	14	8.22	24.94
1342	5	5	11	15	8.21	24.82
1348	5	5	11	16	8.17	24.52
1354	5	5	11	17	8.13	24.15
1360	5	5	11	18	8.11	23.83
1366	5	5	11	19	8.10	23.56
1372	5	5	11	20	8.11	23.45
1378	5	5	11	21	8.11	23.57
1384	5	5	11	22	8.11	23.86
1390	5	5	11	23	8.16	24.24
1396	5	5	12	0	8.26	24.61
1402	5	5	12	1	8.33	24.91
1408	5	5	12	2	8.32	25.07
1414	5	5	12	3	8.32	24.98
1420	5	5	12	4	8.35	24.68
1426	5	5	12	5	8.27	24.30

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1432	5	5	12	6	8.20	23.94
1438	5	5	12	7	8.17	23.57
1444	5	5	12	8	8.15	23.30
1450	5	5	12	9	8.13	23.28
1456	5	5	12	10	8.13	23.47
1462	5	5	12	11	8.12	23.82
1468	5	5	12	12	8.14	24.20
1474	5	5	12	13	8.19	24.56
1480	5	5	12	14	8.23	24.81
1486	5	5	12	15	8.24	24.88
1492	5	5	12	16	8.20	24.74
1498	5	5	12	17	8.17	24.43
1504	5	5	12	18	8.17	24.11
1510	5	5	12	19	8.17	23.84
1516	5	5	12	20	8.15	23.63
1522	5	5	12	21	8.14	23.58
1528	5	5	12	22	8.14	23.72
1534	5	5	12	23	8.15	24.04
1540	5	5	13	0	8.19	24.40
1546	5	5	13	1	8.28	24.74
1552	5	5	13	2	8.34	24.99
1558	5	5	13	3	8.36	25.07
1564	5	5	13	4	8.35	24.95
1570	5	5	13	5	8.26	24.67
1576	5	5	13	6	8.23	24.29
1582	5	5	13	7	8.22	23.97
1588	5	5	13	8	8.19	23.59
1594	5	5	13	9	8.25	23.41
1600	5	5	13	10	8.26	23.44
1606	5	5	13	11	8.23	23.66
1612	5	5	13	12	8.22	23.98
1618	5	5	13	13	8.27	24.28
1624	5	5	13	14	8.33	24.61
1630	5	5	13	15	8.39	24.81
1636	5	5	13	16	8.42	24.84
1642	5	5	13	17	8.41	24.66
1648	5	5	13	18	8.37	24.34
1654	5	5	13	19	8.35	24.03
1660	5	5	13	20	8.35	23.75

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1666	5	5	13	21	8.36	23.58
1672	5	5	13	22	8.35	23.51
1678	5	5	13	23	8.35	23.64
1684	5	5	14	0	8.37	23.91
1690	5	5	14	1	8.44	24.20
1696	5	5	14	2	8.52	24.49
1702	5	5	14	3	8.58	24.69
1708	5	5	14	4	8.61	24.76
1714	5	5	14	5	8.60	24.65
1720	5	5	14	6	8.56	24.37
1726	5	5	14	7	8.47	24.05
1732	5	5	14	8	8.43	23.76
1738	5	5	14	9	8.42	23.51
1744	5	5	14	10	8.43	23.39
1750	5	5	14	11	8.45	23.48
1756	5	5	14	12	8.50	23.69
1762	5	5	14	13	8.61	24.01
1768	5	5	14	14	8.71	24.35
1774	5	5	14	15	8.81	24.61
1780	5	5	14	16	8.83	24.78
1786	5	5	14	17	8.84	24.78
1792	5	5	14	18	8.82	24.58
1798	5	5	14	19	8.79	24.31
1804	5	5	14	20	8.76	24.02
1810	5	5	14	21	8.73	23.81
1816	5	5	14	22	8.71	23.63
1822	5	5	14	23	8.72	23.62
1828	5	5	15	0	8.74	23.80
1834	5	5	15	1	8.77	24.08
1840	5	5	15	2	8.81	24.37
1846	5	5	15	3	8.88	24.66
1852	5	5	15	4	8.94	24.85
1858	5	5	15	5	8.96	24.86
1864	5	5	15	6	8.93	24.70
1870	5	5	15	7	8.88	24.44
1876	5	5	15	8	8.84	24.15
1882	5	5	15	9	8.82	23.85
1888	5	5	15	10	8.81	23.61
1894	5	5	15	11	8.80	23.55

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1900	5	5	15	12	8.80	23.63
1906	5	5	15	13	8.82	23.88
1912	5	5	15	14	8.85	24.17
1918	5	5	15	15	8.92	24.48
1924	5	5	15	16	9.01	24.74
1930	5	5	15	17	9.06	24.88
1936	5	5	15	18	9.07	24.82
1942	5	5	15	19	9.03	24.62
1948	5	5	15	20	8.98	24.32
1954	5	5	15	21	8.92	24.07
1960	5	5	15	22	8.88	23.84
1966	5	5	15	23	8.87	23.66
1972	5	5	16	0	8.87	23.70
1978	5	5	16	1	8.89	23.87
1984	5	5	16	2	8.93	24.16
1990	5	5	16	3	8.99	24.44
1996	5	5	16	4	9.07	24.73
2002	5	5	16	5	9.12	24.90
2008	5	5	16	6	9.14	24.93
2014	5	5	16	7	9.10	24.74
2020	5	5	16	8	9.05	24.47
2026	5	5	16	9	9.00	24.16
2032	5	5	16	10	8.96	23.91
2038	5	5	16	11	8.92	23.67
2044	5	5	16	12	8.92	23.57
2050	5	5	16	13	8.93	23.68
2056	5	5	16	14	8.98	23.93
2062	5	5	16	15	9.07	24.20
2068	5	5	16	16	9.16	24.54
2074	5	5	16	17	9.20	24.77
2080	5	5	16	18	9.22	24.89
2086	5	5	16	19	9.21	24.82
2092	5	5	16	20	9.19	24.62
2098	5	5	16	21	9.15	24.33
2104	5	5	16	22	9.07	24.06
2110	5	5	16	23	9.01	23.79
2116	5	5	17	0	8.99	23.64
2122	5	5	17	1	9.00	23.66
2128	5	5	17	2	9.04	23.81

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2134	5	5	17	3	9.12	24.09
2140	5	5	17	4	9.11	24.35
2146	5	5	17	5	9.13	24.59
2152	5	5	17	6	9.16	24.77
2158	5	5	17	7	9.17	24.80
2164	5	5	17	8	9.13	24.65
2170	5	5	17	9	9.04	24.41
2176	5	5	17	10	9.00	24.09
2182	5	5	17	11	9.03	23.84
2188	5	5	17	12	9.07	23.63
2194	5	5	17	13	9.07	23.59
2200	5	5	17	14	9.03	23.71
2206	5	5	17	15	8.89	23.97
2212	5	5	17	16	8.87	24.30
2218	5	5	17	17	8.97	24.59
2224	5	5	17	18	9.10	24.85
2230	5	5	17	19	9.18	24.96
2236	5	5	17	20	9.19	24.86
2242	5	5	17	21	9.15	24.60
2248	5	5	17	22	9.04	24.28
2254	5	5	17	23	8.95	24.00
2260	5	5	18	0	8.89	23.74
2266	5	5	18	1	8.87	23.57
2272	5	5	18	2	8.86	23.58
2278	5	5	18	3	8.88	23.78
2284	5	5	18	4	8.96	24.10
2290	5	5	18	5	9.05	24.40
2296	5	5	18	6	9.10	24.63
2302	5	5	18	7	9.14	24.82
2308	5	5	18	8	9.14	24.80
2314	5	5	18	9	9.11	24.62
2320	5	5	18	10	9.07	24.33
2326	5	5	18	11	8.97	24.02
2332	5	5	18	12	8.92	23.76
2338	5	5	18	13	8.90	23.57
2344	5	5	18	14	8.91	23.54
2350	5	5	18	15	8.94	23.68
2356	5	5	18	16	9.02	24.02
2362	5	5	18	17	9.12	24.36

AQUA SURVEY, INC.
ADCP
Hourly Bottom Temperatures And Depths
E & E Broadwater

Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2368	5	5	18	18	9.32	24.66
2374	5	5	18	19	9.48	24.93
2380	5	5	18	20	9.51	25.04
2386	5	5	18	21	9.51	24.93
2392	5	5	18	22	9.46	24.63
2398	5	5	18	23	9.31	24.27
2404	5	5	19	0	9.17	23.95
2410	5	5	19	1	9.06	23.65
2416	5	5	19	2	8.97	23.50
2422	5	5	19	3	8.99	23.53
2428	5	5	19	4	9.09	23.75
2434	5	5	19	5	9.16	24.10
2440	5	5	19	6	9.34	24.42
2446	5	5	19	7	9.46	24.68
2452	5	5	19	8	9.48	24.87
2458	5	5	19	9	9.49	24.82
2464	5	5	19	10	9.43	24.60
2470	5	5	19	11	9.38	24.27
2476	5	5	19	12	9.29	23.94
2482	5	5	19	13	9.16	23.67
2488	5	5	19	14	9.12	23.47
2494	5	5	19	15	9.13	23.49
2500	5	5	19	16	9.23	23.73
2506	5	5	19	17	9.45	24.09
2512	5	5	19	18	9.49	24.48
2518	5	5	19	19	9.51	24.85
2524	5	5	19	20	9.45	25.07
2530	5	5	19	21	9.43	25.12
2536	5	5	19	22	9.47	24.90
2542	5	5	19	23	9.52	24.56
2548	5	5	20	0	9.50	24.15
2554	5	5	20	1	9.43	23.76
2560	5	5	20	2	9.38	23.45
2566	5	5	20	3	9.38	23.32
2572	5	5	20	4	9.46	23.43
2578	5	5	20	5	9.50	23.74
2584	5	5	20	6	9.45	24.09
2590	5	5	20	7	9.41	24.47
2596	5	5	20	8	9.38	24.75

AQUA SURVEY, INC.
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Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2602	5	5	20	9	9.36	24.94
2608	5	5	20	10	9.37	24.90
2614	5	5	20	11	9.41	24.61
2620	5	5	20	12	9.49	24.28
2626	5	5	20	13	9.49	23.91
2632	5	5	20	14	9.45	23.60
2638	5	5	20	15	9.42	23.41
2644	5	5	20	16	9.43	23.50
2650	5	5	20	17	9.45	23.77
2656	5	5	20	18	9.38	24.15
2662	5	5	20	19	9.36	24.55
2668	5	5	20	20	9.29	24.91
2674	5	5	20	21	9.27	25.15
2680	5	5	20	22	9.28	25.15
2686	5	5	20	23	9.31	24.91
2692	5	5	21	0	9.36	24.52
2698	5	5	21	1	9.41	24.11
2704	5	5	21	2	9.44	23.69
2710	5	5	21	3	9.44	23.36
2716	5	5	21	4	9.44	23.26
2722	5	5	21	5	9.44	23.44
2728	5	5	21	6	9.41	23.84
2734	5	5	21	7	9.36	24.25
2740	5	5	21	8	9.31	24.62
2746	5	5	21	9	9.30	24.97
2752	5	5	21	10	9.30	25.16
2758	5	5	21	11	9.31	25.01
2764	5	5	21	12	9.35	24.69
2770	5	5	21	13	9.40	24.34
2776	5	5	21	14	9.44	23.95
2782	5	5	21	15	9.41	23.66
2788	5	5	21	16	9.44	23.53
2794	5	5	21	17	9.41	23.63
2800	5	5	21	18	9.35	24.01
2806	5	5	21	19	9.31	24.46
2812	5	5	21	20	9.32	24.87
2818	5	5	21	21	9.35	25.23
2824	5	5	21	22	9.35	25.39
2830	5	5	21	23	9.35	25.27

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Station C-28
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2836	5	5	22	0	9.30	24.94
2842	5	5	22	1	9.32	24.47
2848	5	5	22	2	9.36	23.95
2854	5	5	22	3	9.38	23.53
2860	5	5	22	4	9.38	23.23
2866	5	5	22	5	9.38	23.20
2872	5	5	22	6	9.34	23.46
2878	5	5	22	7	9.32	23.87
2884	5	5	22	8	9.33	24.28
2890	5	5	22	9	9.35	24.70
2896	5	5	22	10	9.35	25.00
2902	5	5	22	11	9.36	25.11
2908	5	5	22	12	9.34	24.91
2914	5	5	22	13	9.32	24.52
2920	5	5	22	14	9.32	24.09
2926	5	5	22	15	9.34	23.70
2932	5	5	22	16	9.35	23.43
2938	5	5	22	17	9.35	23.35
2944	5	5	22	18	9.34	23.57
2950	5	5	22	19	9.33	23.99
2956	5	5	22	20	9.36	24.48
2962	5	5	22	21	9.43	24.91
2968	5	5	22	22	9.56	25.24
2974	5	5	22	23	9.58	25.37
2980	5	5	23	0	9.59	25.19
2986	5	5	23	1	9.50	24.81
2992	5	5	23	2	9.38	24.33
2998	5	5	23	3	9.34	23.83
3004	5	5	23	4	9.33	23.37
3010	5	5	23	5	9.33	23.11
3016	5	5	23	6	9.34	23.16
3022	5	5	23	7	9.35	23.49
3028	5	5	23	8	9.38	23.93
3034	5	5	23	9	9.50	24.35
3040	5	5	23	10	9.61	24.74
3046	5	5	23	11	9.67	25.05
3052	5	5	23	12	9.69	25.06
3058	5	5	23	13	9.67	24.83
3064	5	5	23	14	9.57	24.41

AQUA SURVEY, INC.
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E & E Broadwater

Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3070	5	5	23	15	9.40	23.98
3076	5	5	23	16	9.34	23.62
3082	5	5	23	17	9.34	23.35
3088	5	5	23	18	9.36	23.39
3094	5	5	23	19	9.49	23.70
3100	5	5	23	20	9.67	24.25
3106	5	5	23	21	9.75	24.72
3112	5	5	23	22	9.74	25.15
3118	5	5	23	23	9.73	25.44
3124	5	5	24	0	9.76	25.51
3130	5	5	24	1	9.79	25.26
3136	5	5	24	2	9.81	24.82
3142	5	5	24	3	9.79	24.31
3148	5	5	24	4	9.64	23.84
3154	5	5	24	5	9.54	23.43
3160	5	5	24	6	9.53	23.21
3166	5	5	24	7	9.67	23.34
3172	5	5	24	8	9.76	23.71
3178	5	5	24	9	9.78	24.20
3184	5	5	24	10	9.80	24.62
3190	5	5	24	11	9.83	25.00
3196	5	5	24	12	9.86	25.26
3202	5	5	24	13	9.91	25.21
3208	5	5	24	14	9.91	24.87
3214	5	5	24	15	9.86	24.44
3220	5	5	24	16	9.75	24.04
3226	5	5	24	17	9.63	23.67
3232	5	5	24	18	9.62	23.50
3238	5	5	24	19	9.67	23.57
3244	5	5	24	20	9.77	23.95
3250	5	5	24	21	9.84	24.45
3256	5	5	24	22	9.87	24.94
3262	5	5	24	23	9.91	25.35
3268	5	5	25	0	9.94	25.67
3274	5	5	25	1	9.93	25.66
3280	5	5	25	2	9.87	25.34
3286	5	5	25	3	9.68	24.88
3292	5	5	25	4	9.51	24.41
3298	5	5	25	5	9.42	23.94

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Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3304	5	5	25	6	9.39	23.60
3310	5	5	25	7	9.41	23.49
3316	5	5	25	8	9.44	23.69
3322	5	5	25	9	9.54	24.10
3328	5	5	25	10	9.63	24.53
3334	5	5	25	11	9.70	24.96
3340	5	5	25	12	9.64	25.32
3346	5	5	25	13	9.49	25.46
3352	5	5	25	14	9.42	25.28
3358	5	5	25	15	9.58	24.87
3364	5	5	25	16	9.95	24.44
3370	5	5	25	17	10.29	24.02
3376	5	5	25	18	10.41	23.65
3382	5	5	25	19	10.45	23.43
3388	5	5	25	20	10.35	23.58
3394	5	5	25	21	9.67	24.01
3400	5	5	25	22	9.58	24.48
3406	5	5	25	23	9.54	24.91
3412	5	5	26	0	9.54	25.37
3418	5	5	26	1	9.53	25.64
3424	5	5	26	2	9.52	25.63
3430	5	5	26	3	9.53	25.35
3436	5	5	26	4	9.58	24.94
3442	5	5	26	5	9.75	24.48
3448	5	5	26	6	9.81	24.02
3454	5	5	26	7	9.79	23.69
3460	5	5	26	8	9.73	23.55
3466	5	5	26	9	9.64	23.67
3472	5	5	26	10	9.54	23.98
3478	5	5	26	11	9.49	24.36
3484	5	5	26	12	9.52	24.72
3490	5	5	26	13	9.56	24.99
3496	5	5	26	14	9.56	25.09
3502	5	5	26	15	9.55	24.93
3508	5	5	26	16	9.55	24.55
3514	5	5	26	17	9.56	24.14
3520	5	5	26	18	9.60	23.75
3526	5	5	26	19	9.60	23.48
3532	5	5	26	20	9.70	23.35

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Station C-28
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3538	5	5	26	21	9.55	23.59
3544	5	5	26	22	9.55	24.04
3550	5	5	26	23	9.61	24.50
3556	5	5	27	0	9.65	24.96
3562	5	5	27	1	9.69	25.34
3568	5	5	27	2	9.74	25.51
3574	5	5	27	3	9.74	25.40
3580	5	5	27	4	9.73	25.02
3586	5	5	27	5	9.79	24.53
3592	5	5	27	6	9.73	24.06
3598	5	5	27	7	9.71	23.58
3604	5	5	27	8	9.70	23.25
3610	5	5	27	9	9.67	23.16
3616	5	5	27	10	9.68	23.41
3622	5	5	27	11	9.69	23.83
3628	5	5	27	12	9.71	24.24
3634	5	5	27	13	9.76	24.64
3640	5	5	27	14	9.79	24.97
3646	5	5	27	15	9.81	25.10
3652	5	5	27	16	9.83	24.92
3658	5	5	27	17	9.82	24.57
3664	5	5	27	18	9.80	24.16
3670	5	5	27	19	9.82	23.79
3676	5	5	27	20	9.81	23.50
3682	5	5	27	21	9.80	23.36
3688	5	5	27	22	9.79	23.57
3694	5	5	27	23	9.82	23.92
3700	5	5	28	0	9.85	24.36
3706	5	5	28	1	9.86	24.76
3712	5	5	28	2	9.86	25.11
3718	5	5	28	3	9.89	25.29
3724	5	5	28	4	9.89	25.21
3730	5	5	28	5	9.88	24.85
3736	5	5	28	6	9.91	24.40
3742	5	5	28	7	9.95	23.95
3748	5	5	28	8	9.96	23.54
3754	5	5	28	9	9.93	23.24
3760	5	5	28	10	9.91	23.19
3766	5	5	28	11	9.90	23.45

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Station C-28
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3772	5	5	28	12	9.89	23.85
3778	5	5	28	13	9.91	24.26
3784	5	5	28	14	9.93	24.66
3790	5	5	28	15	9.96	24.99
3796	5	5	28	16	10.00	25.10
3802	5	5	28	17	10.00	24.92
3808	5	5	28	18	9.98	24.59
3814	5	5	28	19	9.96	24.19
3820	5	5	28	20	9.94	23.79
3826	5	5	28	21	9.95	23.52
3832	5	5	28	22	9.94	23.37
3838	5	5	28	23	9.95	23.49
3844	5	5	29	0	9.99	23.83
3850	5	5	29	1	10.04	24.28
3856	5	5	29	2	10.07	24.66
3862	5	5	29	3	10.12	24.99
3868	5	5	29	4	10.18	25.19
3874	5	5	29	5	10.19	25.11
3880	5	5	29	6	10.15	24.79
3886	5	5	29	7	10.13	24.37
3892	5	5	29	8	10.10	23.95
3898	5	5	29	9	10.06	23.54
3904	5	5	29	10	10.00	23.27
3910	5	5	29	11	9.97	23.20
3916	5	5	29	12	9.97	23.45
3922	5	5	29	13	9.98	23.80
3928	5	5	29	14	10.01	24.25
3934	5	5	29	15	10.13	24.62
3940	5	5	29	16	10.28	24.95
3946	5	5	29	17	10.33	25.09
3952	5	5	29	18	10.29	24.92
3958	5	5	29	19	10.21	24.60
3964	5	5	29	20	10.15	24.21
3970	5	5	29	21	10.09	23.87
3976	5	5	29	22	10.06	23.53
3982	5	5	29	23	10.05	23.38
3988	5	5	30	0	10.03	23.48
3994	5	5	30	1	10.07	23.81
4000	5	5	30	2	10.24	24.23

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Station C-28
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4006	5	5	30	3	10.37	24.62
4012	5	5	30	4	10.42	24.91
4018	5	5	30	5	10.42	25.13
4024	5	5	30	6	10.42	25.10
4030	5	5	30	7	10.41	24.82
4036	5	5	30	8	10.34	24.42
4042	5	5	30	9	10.20	24.00
4048	5	5	30	10	10.09	23.61
4054	5	5	30	11	10.04	23.32
4060	5	5	30	12	10.03	23.29
4066	5	5	30	13	10.06	23.50
4072	5	5	30	14	10.21	23.89
4078	5	5	30	15	10.35	24.30
4084	5	5	30	16	10.40	24.69
4090	5	5	30	17	10.36	25.01
4096	5	5	30	18	10.33	25.15
4102	5	5	30	19	10.32	25.00
4108	5	5	30	20	10.35	24.65
4114	5	5	30	21	10.39	24.27
4120	5	5	30	22	10.39	23.90
4126	5	5	30	23	10.32	23.55
4132	5	5	31	0	10.28	23.35
4138	5	5	31	1	10.31	23.42
4144	5	5	31	2	10.37	23.73
4150	5	5	31	3	10.42	24.14
4156	5	5	31	4	10.41	24.50
4162	5	5	31	5	10.35	24.83
4168	5	5	31	6	10.36	25.07
4174	5	5	31	7	10.37	25.06
4180	5	5	31	8	10.35	24.78
4186	5	5	31	9	10.34	24.40
4192	5	5	31	10	10.38	24.03
4198	5	5	31	11	10.37	23.70
4204	5	5	31	12	10.34	23.44
4210	5	5	31	13	10.33	23.36
4216	5	5	31	14	10.36	23.61
4222	5	5	31	15	10.38	24.00
4228	5	5	31	16	10.35	24.43
4234	5	5	31	17	10.44	24.78

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Station C-28
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4240	5	5	31	18	10.63	25.12
4246	5	5	31	19	10.74	25.26
4252	5	5	31	20	10.71	25.11
4258	5	5	31	21	10.55	24.74
4264	5	5	31	22	10.38	24.37
4270	5	5	31	23	10.35	23.97
4276	5	6	1	0	10.36	23.57
4282	5	6	1	1	10.36	23.35
4288	5	6	1	2	10.36	23.38
4294	5	6	1	3	10.36	23.68
4300	5	6	1	4	10.36	24.05
4306	5	6	1	5	10.51	24.46
4312	5	6	1	6	10.76	24.78
4318	5	6	1	7	10.87	25.03
4324	5	6	1	8	10.89	25.04
4330	5	6	1	9	10.83	24.79
4336	5	6	1	10	10.66	24.42
4342	5	6	1	11	10.47	24.04
4348	5	6	1	12	10.39	23.70
4354	5	6	1	13	10.37	23.43
4360	5	6	1	14	10.37	23.39
4366	5	6	1	15	10.39	23.63
4372	5	6	1	16	10.47	24.04
4378	5	6	1	17	10.68	24.47
4384	5	6	1	18	10.83	24.86
4390	5	6	1	19	10.99	25.16
4396	5	6	1	20	11.07	25.30
4402	5	6	1	21	11.09	25.11
4408	5	6	1	22	11.02	24.72
4414	5	6	1	23	10.79	24.30
4420	5	6	2	0	10.68	23.87
4426	5	6	2	1	10.52	23.50
4432	5	6	2	2	10.46	23.27
4438	5	6	2	3	10.50	23.30
4444	5	6	2	4	10.63	23.63
4450	5	6	2	5	10.77	24.01
4456	5	6	2	6	10.90	24.40
4462	5	6	2	7	11.03	24.73
4468	5	6	2	8	11.06	25.00

AQUA SURVEY, INC.
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Station C-28
5/2 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4474	5	6	2	9	11.06	24.97
4480	5	6	2	10	11.11	24.75

AQUA SURVEY, INC.
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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
12	5	4	30	17	XXXX	XXXX
18	5	4	30	18	XXXX	13.19
24	5	4	30	19	6.01	12.92
30	5	4	30	20	6.10	12.55
36	5	4	30	21	5.88	12.16
42	5	4	30	22	6.38	11.84
48	5	4	30	23	6.59	11.69
54	5	5	1	0	6.26	11.74
60	5	5	1	1	6.66	12.00
66	5	5	1	2	5.99	12.41
72	5	5	1	3	5.58	12.85
78	5	5	1	4	5.57	13.20
84	5	5	1	5	5.72	13.44
90	5	5	1	6	7.65	13.34
96	5	5	1	7	7.09	13.06
102	5	5	1	8	5.97	12.70
108	5	5	1	9	6.00	12.24
114	5	5	1	10	6.02	11.86
120	5	5	1	11	6.30	11.53
126	5	5	1	12	6.48	11.41
132	5	5	1	13	7.11	11.52
138	5	5	1	14	6.43	11.87
144	5	5	1	15	6.09	12.32
150	5	5	1	16	5.67	12.78
156	5	5	1	17	5.56	13.14
162	5	5	1	18	5.65	13.33
168	5	5	1	19	8.30	13.19
174	5	5	1	20	7.06	12.88
180	5	5	1	21	5.90	12.53
186	5	5	1	22	6.08	12.13
192	5	5	1	23	6.26	11.79
198	5	5	2	0	6.46	11.60
204	5	5	2	1	6.56	11.63
210	5	5	2	2	6.59	11.85
216	5	5	2	3	6.10	12.24
222	5	5	2	4	5.84	12.70
228	5	5	2	5	5.73	13.08
234	5	5	2	6	5.77	13.38
240	5	5	2	7	6.22	13.42

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4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
246	5	5	2	8	8.12	13.11
252	5	5	2	9	5.96	12.78
258	5	5	2	10	6.13	12.37
264	5	5	2	11	6.24	11.96
270	5	5	2	12	6.32	11.64
276	5	5	2	13	6.54	11.46
282	5	5	2	14	6.90	11.58
288	5	5	2	15	6.38	11.92
294	5	5	2	16	6.08	12.38
300	5	5	2	17	5.95	12.85
306	5	5	2	18	5.95	13.20
312	5	5	2	19	5.97	13.43
318	5	5	2	20	8.04	13.30
324	5	5	2	21	6.80	12.98
330	5	5	2	22	6.21	12.63
336	5	5	2	23	6.07	12.17
342	5	5	3	0	6.02	11.80
348	5	5	3	1	6.11	11.54
354	5	5	3	2	6.95	11.46
360	5	5	3	3	6.52	11.71
366	5	5	3	4	6.01	12.14
372	5	5	3	5	5.95	12.62
378	5	5	3	6	6.06	13.05
384	5	5	3	7	6.29	13.36
390	5	5	3	8	7.74	13.38
396	5	5	3	9	8.11	13.16
402	5	5	3	10	7.11	12.78
408	5	5	3	11	6.75	12.36
414	5	5	3	12	6.70	11.95
420	5	5	3	13	6.68	11.61
426	5	5	3	14	6.75	11.44
432	5	5	3	15	7.00	11.56
438	5	5	3	16	6.66	11.91
444	5	5	3	17	6.20	12.42
450	5	5	3	18	6.02	12.90
456	5	5	3	19	6.15	13.33
462	5	5	3	20	6.25	13.60
468	5	5	3	21	8.11	13.49
474	5	5	3	22	8.19	13.12

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
480	5	5	3	23	6.64	12.70
486	5	5	4	0	6.55	12.23
492	5	5	4	1	6.50	11.81
498	5	5	4	2	6.60	11.52
504	5	5	4	3	6.69	11.46
510	5	5	4	4	7.57	11.70
516	5	5	4	5	6.53	12.11
522	5	5	4	6	6.33	12.63
528	5	5	4	7	6.13	13.10
534	5	5	4	8	6.30	13.45
540	5	5	4	9	6.47	13.54
546	5	5	4	10	8.31	13.24
552	5	5	4	11	7.58	12.85
558	5	5	4	12	6.52	12.40
564	5	5	4	13	6.66	11.96
570	5	5	4	14	6.81	11.61
576	5	5	4	15	6.82	11.44
582	5	5	4	16	7.07	11.62
588	5	5	4	17	6.58	12.01
594	5	5	4	18	6.53	12.53
600	5	5	4	19	6.24	13.07
606	5	5	4	20	6.39	13.50
612	5	5	4	21	6.62	13.71
618	5	5	4	22	6.71	13.60
624	5	5	4	23	8.11	13.16
630	5	5	5	0	6.56	12.70
636	5	5	5	1	6.64	12.19
642	5	5	5	2	6.70	11.75
648	5	5	5	3	6.77	11.44
654	5	5	5	4	7.21	11.38
660	5	5	5	5	7.27	11.67
666	5	5	5	6	6.83	12.10
672	5	5	5	7	6.62	12.64
678	5	5	5	8	6.39	13.12
684	5	5	5	9	6.42	13.45
690	5	5	5	10	6.67	13.51
696	5	5	5	11	8.52	13.17
702	5	5	5	12	6.55	12.77
708	5	5	5	13	6.75	12.30

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
714	5	5	5	14	6.90	11.85
720	5	5	5	15	7.03	11.52
726	5	5	5	16	7.12	11.40
732	5	5	5	17	7.14	11.64
738	5	5	5	18	6.74	12.10
744	5	5	5	19	6.55	12.64
750	5	5	5	20	6.49	13.20
756	5	5	5	21	6.59	13.61
762	5	5	5	22	6.64	13.77
768	5	5	5	23	8.55	13.52
774	5	5	6	0	6.84	13.10
780	5	5	6	1	6.73	12.60
786	5	5	6	2	6.82	12.08
792	5	5	6	3	7.15	11.63
798	5	5	6	4	6.97	11.34
804	5	5	6	5	7.22	11.34
810	5	5	6	6	7.77	11.69
816	5	5	6	7	6.67	12.17
822	5	5	6	8	6.59	12.71
828	5	5	6	9	6.58	13.19
834	5	5	6	10	6.71	13.53
840	5	5	6	11	7.38	13.49
846	5	5	6	12	8.50	13.16
852	5	5	6	13	6.98	12.76
858	5	5	6	14	6.92	12.29
864	5	5	6	15	7.27	11.86
870	5	5	6	16	7.61	11.57
876	5	5	6	17	7.93	11.55
882	5	5	6	18	7.70	11.87
888	5	5	6	19	7.19	12.37
894	5	5	6	20	7.02	12.90
900	5	5	6	21	6.91	13.47
906	5	5	6	22	6.98	13.81
912	5	5	6	23	7.38	13.86
918	5	5	7	0	8.53	13.56
924	5	5	7	1	7.26	13.10
930	5	5	7	2	7.29	12.61
936	5	5	7	3	7.55	12.08
942	5	5	7	4	7.40	11.65

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
948	5	5	7	5	7.88	11.43
954	5	5	7	6	8.26	11.53
960	5	5	7	7	8.07	11.92
966	5	5	7	8	7.20	12.47
972	5	5	7	9	7.06	12.97
978	5	5	7	10	7.28	13.38
984	5	5	7	11	8.35	13.60
990	5	5	7	12	7.30	13.47
996	5	5	7	13	7.38	13.10
1002	5	5	7	14	7.55	12.64
1008	5	5	7	15	8.11	12.14
1014	5	5	7	16	8.20	11.75
1020	5	5	7	17	8.23	11.47
1026	5	5	7	18	8.18	11.47
1032	5	5	7	19	7.77	11.84
1038	5	5	7	20	7.75	12.28
1044	5	5	7	21	7.73	12.86
1050	5	5	7	22	7.95	13.32
1056	5	5	7	23	8.27	13.61
1062	5	5	8	0	8.34	13.55
1068	5	5	8	1	7.74	13.22
1074	5	5	8	2	7.86	12.78
1080	5	5	8	3	8.01	12.27
1086	5	5	8	4	8.04	11.81
1092	5	5	8	5	8.07	11.42
1098	5	5	8	6	8.23	11.30
1104	5	5	8	7	7.91	11.51
1110	5	5	8	8	7.77	11.95
1116	5	5	8	9	7.52	12.46
1122	5	5	8	10	6.95	12.99
1128	5	5	8	11	7.76	13.34
1134	5	5	8	12	8.33	13.45
1140	5	5	8	13	8.17	13.28
1146	5	5	8	14	7.57	12.91
1152	5	5	8	15	7.80	12.46
1158	5	5	8	16	7.96	12.02
1164	5	5	8	17	8.11	11.67
1170	5	5	8	18	8.20	11.52
1176	5	5	8	19	8.01	11.70

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1182	5	5	8	20	7.97	12.11
1188	5	5	8	21	7.77	12.64
1194	5	5	8	22	7.41	13.22
1200	5	5	8	23	7.36	13.66
1206	5	5	9	0	7.86	13.83
1212	5	5	9	1	7.43	13.70
1218	5	5	9	2	7.71	13.29
1224	5	5	9	3	8.15	12.83
1230	5	5	9	4	8.22	12.28
1236	5	5	9	5	8.25	11.84
1242	5	5	9	6	8.12	11.50
1248	5	5	9	7	8.21	11.46
1254	5	5	9	8	8.24	11.73
1260	5	5	9	9	7.98	12.15
1266	5	5	9	10	7.37	12.68
1272	5	5	9	11	7.38	13.15
1278	5	5	9	12	7.51	13.44
1284	5	5	9	13	8.00	13.47
1290	5	5	9	14	7.57	13.20
1296	5	5	9	15	7.73	12.77
1302	5	5	9	16	7.99	12.31
1308	5	5	9	17	8.17	11.90
1314	5	5	9	18	8.20	11.63
1320	5	5	9	19	8.07	11.61
1326	5	5	9	20	8.32	11.89
1332	5	5	9	21	7.98	12.31
1338	5	5	9	22	7.65	12.86
1344	5	5	9	23	7.44	13.35
1350	5	5	10	0	7.36	13.72
1356	5	5	10	1	7.37	13.81
1362	5	5	10	2	7.41	13.59
1368	5	5	10	3	7.69	13.15
1374	5	5	10	4	7.97	12.64
1380	5	5	10	5	7.95	12.12
1386	5	5	10	6	8.15	11.73
1392	5	5	10	7	8.10	11.49
1398	5	5	10	8	7.89	11.54
1404	5	5	10	9	8.27	11.87
1410	5	5	10	10	7.90	12.29

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1416	5	5	10	11	7.73	12.76
1422	5	5	10	12	7.56	13.15
1428	5	5	10	13	7.63	13.38
1434	5	5	10	14	7.85	13.32
1440	5	5	10	15	7.72	13.03
1446	5	5	10	16	7.89	12.61
1452	5	5	10	17	7.98	12.16
1458	5	5	10	18	8.00	11.82
1464	5	5	10	19	8.09	11.61
1470	5	5	10	20	7.95	11.68
1476	5	5	10	21	8.36	11.96
1482	5	5	10	22	7.96	12.39
1488	5	5	10	23	7.74	12.87
1494	5	5	11	0	7.48	13.28
1500	5	5	11	1	7.43	13.55
1506	5	5	11	2	7.52	13.54
1512	5	5	11	3	7.52	13.22
1518	5	5	11	4	7.95	12.82
1524	5	5	11	5	7.94	12.34
1530	5	5	11	6	7.96	11.89
1536	5	5	11	7	7.94	11.55
1542	5	5	11	8	8.21	11.41
1548	5	5	11	9	8.08	11.56
1554	5	5	11	10	8.53	11.90
1560	5	5	11	11	7.87	12.30
1566	5	5	11	12	7.59	12.78
1572	5	5	11	13	7.47	13.12
1578	5	5	11	14	7.74	13.27
1584	5	5	11	15	7.60	13.14
1590	5	5	11	16	7.75	12.82
1596	5	5	11	17	8.13	12.41
1602	5	5	11	18	7.95	12.02
1608	5	5	11	19	7.95	11.75
1614	5	5	11	20	8.27	11.64
1620	5	5	11	21	8.07	11.77
1626	5	5	11	22	8.50	12.03
1632	5	5	11	23	7.92	12.46
1638	5	5	12	0	7.73	12.88
1644	5	5	12	1	7.50	13.21

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1650	5	5	12	2	7.51	13.38
1656	5	5	12	3	8.62	13.31
1662	5	5	12	4	7.83	12.99
1668	5	5	12	5	7.98	12.59
1674	5	5	12	6	8.08	12.13
1680	5	5	12	7	8.07	11.77
1686	5	5	12	8	8.09	11.50
1692	5	5	12	9	8.31	11.45
1698	5	5	12	10	8.38	11.70
1704	5	5	12	11	8.47	12.02
1710	5	5	12	12	7.88	12.44
1716	5	5	12	13	7.80	12.85
1722	5	5	12	14	7.82	13.13
1728	5	5	12	15	8.15	13.20
1734	5	5	12	16	7.92	13.04
1740	5	5	12	17	8.46	12.72
1746	5	5	12	18	8.25	12.36
1752	5	5	12	19	8.27	12.02
1758	5	5	12	20	8.41	11.81
1764	5	5	12	21	9.24	11.76
1770	5	5	12	22	9.04	11.92
1776	5	5	12	23	8.50	12.20
1782	5	5	13	0	8.39	12.62
1788	5	5	13	1	8.20	13.02
1794	5	5	13	2	7.97	13.30
1800	5	5	13	3	8.16	13.40
1806	5	5	13	4	8.46	13.27
1812	5	5	13	5	8.51	12.94
1818	5	5	13	6	8.30	12.54
1824	5	5	13	7	8.25	12.12
1830	5	5	13	8	8.21	11.78
1836	5	5	13	9	8.14	11.57
1842	5	5	13	10	8.21	11.59
1848	5	5	13	11	8.36	11.84
1854	5	5	13	12	8.37	12.15
1860	5	5	13	13	8.38	12.57
1866	5	5	13	14	8.33	12.91
1872	5	5	13	15	8.30	13.13
1878	5	5	13	16	8.96	13.13

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
1884	5	5	13	17	9.76	12.90
1890	5	5	13	18	9.06	12.58
1896	5	5	13	19	8.97	12.22
1902	5	5	13	20	8.47	11.92
1908	5	5	13	21	8.54	11.73
1914	5	5	13	22	8.52	11.69
1920	5	5	13	23	8.51	11.84
1926	5	5	14	0	8.46	12.07
1932	5	5	14	1	7.99	12.42
1938	5	5	14	2	7.86	12.75
1944	5	5	14	3	7.80	12.98
1950	5	5	14	4	7.81	13.06
1956	5	5	14	5	9.64	12.91
1962	5	5	14	6	8.90	12.61
1968	5	5	14	7	8.34	12.28
1974	5	5	14	8	8.42	11.95
1980	5	5	14	9	8.49	11.69
1986	5	5	14	10	8.79	11.56
1992	5	5	14	11	8.28	11.66
1998	5	5	14	12	8.54	11.88
2004	5	5	14	13	8.21	12.20
2010	5	5	14	14	7.88	12.59
2016	5	5	14	15	7.81	12.91
2022	5	5	14	16	7.79	13.09
2028	5	5	14	17	7.96	13.09
2034	5	5	14	18	9.51	12.85
2040	5	5	14	19	9.19	12.56
2046	5	5	14	20	8.34	12.21
2052	5	5	14	21	8.34	11.96
2058	5	5	14	22	8.50	11.80
2064	5	5	14	23	8.92	11.81
2070	5	5	15	0	9.11	11.98
2076	5	5	15	1	8.31	12.26
2082	5	5	15	2	8.18	12.61
2088	5	5	15	3	7.96	12.94
2094	5	5	15	4	7.95	13.14
2100	5	5	15	5	9.82	13.15
2106	5	5	15	6	9.66	12.97
2112	5	5	15	7	8.51	12.70

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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2118	5	5	15	8	8.43	12.36
2124	5	5	15	9	8.31	12.03
2130	5	5	15	10	8.48	11.80
2136	5	5	15	11	8.66	11.71
2142	5	5	15	12	8.77	11.80
2148	5	5	15	13	8.46	12.04
2154	5	5	15	14	8.29	12.37
2160	5	5	15	15	8.28	12.75
2166	5	5	15	16	8.12	13.03
2172	5	5	15	17	8.47	13.18
2178	5	5	15	18	9.65	13.09
2184	5	5	15	19	8.49	12.87
2190	5	5	15	20	8.39	12.57
2196	5	5	15	21	8.28	12.24
2202	5	5	15	22	8.51	11.97
2208	5	5	15	23	8.70	11.84
2214	5	5	16	0	8.82	11.87
2220	5	5	16	1	9.34	12.06
2226	5	5	16	2	8.46	12.33
2232	5	5	16	3	8.29	12.71
2238	5	5	16	4	8.22	13.02
2244	5	5	16	5	8.15	13.20
2250	5	5	16	6	9.64	13.20
2256	5	5	16	7	8.63	13.02
2262	5	5	16	8	8.31	12.73
2268	5	5	16	9	8.32	12.38
2274	5	5	16	10	8.38	12.05
2280	5	5	16	11	8.58	11.84
2286	5	5	16	12	9.15	11.73
2292	5	5	16	13	9.16	11.84
2298	5	5	16	14	8.88	12.09
2304	5	5	16	15	8.45	12.42
2310	5	5	16	16	8.44	12.78
2316	5	5	16	17	8.44	13.05
2322	5	5	16	18	9.39	13.19
2328	5	5	16	19	9.20	13.11
2334	5	5	16	20	8.66	12.87
2340	5	5	16	21	8.52	12.55
2346	5	5	16	22	8.35	12.22

AQUA SURVEY, INC.
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Hourly Bottom Temperatures And Depths
E & E Broadwater

Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2352	5	5	16	23	8.46	11.95
2358	5	5	17	0	8.81	11.82
2364	5	5	17	1	8.96	11.83
2370	5	5	17	2	9.45	11.98
2376	5	5	17	3	8.50	12.27
2382	5	5	17	4	8.64	12.61
2388	5	5	17	5	8.39	12.89
2394	5	5	17	6	8.22	13.07
2400	5	5	17	7	10.09	13.09
2406	5	5	17	8	9.63	12.90
2412	5	5	17	9	8.57	12.63
2418	5	5	17	10	8.33	12.31
2424	5	5	17	11	8.44	12.01
2430	5	5	17	12	8.71	11.80
2436	5	5	17	13	8.94	11.74
2442	5	5	17	14	8.55	11.88
2448	5	5	17	15	8.67	12.15
2454	5	5	17	16	8.66	12.52
2460	5	5	17	17	8.47	12.87
2466	5	5	17	18	8.17	13.13
2472	5	5	17	19	9.94	13.23
2478	5	5	17	20	9.97	13.13
2484	5	5	17	21	8.89	12.87
2490	5	5	17	22	8.67	12.53
2496	5	5	17	23	8.60	12.17
2502	5	5	18	0	8.53	11.89
2508	5	5	18	1	8.86	11.73
2514	5	5	18	2	8.55	11.76
2520	5	5	18	3	8.72	11.96
2526	5	5	18	4	8.51	12.28
2532	5	5	18	5	8.35	12.64
2538	5	5	18	6	8.12	12.93
2544	5	5	18	7	8.07	13.13
2550	5	5	18	8	9.94	13.10
2556	5	5	18	9	9.97	12.88
2562	5	5	18	10	8.64	12.57
2568	5	5	18	11	8.50	12.22
2574	5	5	18	12	8.46	11.93
2580	5	5	18	13	8.65	11.73

AQUA SURVEY, INC.
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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2586	5	5	18	14	8.75	11.68
2592	5	5	18	15	9.67	11.86
2598	5	5	18	16	8.67	12.16
2604	5	5	18	17	8.31	12.56
2610	5	5	18	18	8.08	12.94
2616	5	5	18	19	8.06	13.22
2622	5	5	18	20	8.18	13.34
2628	5	5	18	21	10.76	13.20
2634	5	5	18	22	8.49	12.90
2640	5	5	18	23	8.65	12.52
2646	5	5	19	0	8.71	12.13
2652	5	5	19	1	8.84	11.81
2658	5	5	19	2	8.87	11.64
2664	5	5	19	3	8.93	11.69
2670	5	5	19	4	9.21	11.93
2676	5	5	19	5	9.13	12.28
2682	5	5	19	6	8.56	12.67
2688	5	5	19	7	8.28	12.99
2694	5	5	19	8	8.37	13.16
2700	5	5	19	9	10.78	13.10
2706	5	5	19	10	9.79	12.84
2712	5	5	19	11	8.73	12.50
2718	5	5	19	12	8.66	12.14
2724	5	5	19	13	8.65	11.84
2730	5	5	19	14	8.73	11.63
2736	5	5	19	15	9.02	11.64
2742	5	5	19	16	9.45	11.88
2748	5	5	19	17	8.66	12.25
2754	5	5	19	18	8.40	12.71
2760	5	5	19	19	8.16	13.11
2766	5	5	19	20	8.19	13.37
2772	5	5	19	21	10.03	13.40
2778	5	5	19	22	10.09	13.16
2784	5	5	19	23	9.22	12.81
2790	5	5	20	0	8.64	12.36
2796	5	5	20	1	8.81	11.94
2802	5	5	20	2	8.92	11.59
2808	5	5	20	3	9.00	11.45
2814	5	5	20	4	8.89	11.57

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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
2820	5	5	20	5	9.45	11.89
2826	5	5	20	6	8.61	12.29
2832	5	5	20	7	8.28	12.73
2838	5	5	20	8	8.24	13.07
2844	5	5	20	9	8.31	13.26
2850	5	5	20	10	9.07	13.18
2856	5	5	20	11	10.33	12.88
2862	5	5	20	12	8.61	12.49
2868	5	5	20	13	8.63	12.08
2874	5	5	20	14	8.80	11.75
2880	5	5	20	15	8.97	11.55
2886	5	5	20	16	9.05	11.62
2892	5	5	20	17	8.94	11.91
2898	5	5	20	18	8.71	12.33
2904	5	5	20	19	8.33	12.80
2910	5	5	20	20	8.29	13.22
2916	5	5	20	21	8.30	13.48
2922	5	5	20	22	8.32	13.47
2928	5	5	20	23	9.94	13.18
2934	5	5	21	0	8.48	12.76
2940	5	5	21	1	8.73	12.31
2946	5	5	21	2	8.97	11.87
2952	5	5	21	3	8.95	11.50
2958	5	5	21	4	9.02	11.38
2964	5	5	21	5	8.96	11.57
2970	5	5	21	6	9.22	11.99
2976	5	5	21	7	8.79	12.44
2982	5	5	21	8	8.58	12.94
2988	5	5	21	9	8.42	13.29
2994	5	5	21	10	8.68	13.44
3000	5	5	21	11	9.61	13.30
3006	5	5	21	12	10.61	12.95
3012	5	5	21	13	8.93	12.54
3018	5	5	21	14	8.94	12.12
3024	5	5	21	15	9.11	11.79
3030	5	5	21	16	9.47	11.63
3036	5	5	21	17	9.44	11.75
3042	5	5	21	18	9.14	12.11
3048	5	5	21	19	8.99	12.62

AQUA SURVEY, INC.
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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3054	5	5	21	20	8.55	13.15
3060	5	5	21	21	8.43	13.54
3066	5	5	21	22	8.48	13.75
3072	5	5	21	23	9.25	13.60
3078	5	5	22	0	10.25	13.19
3084	5	5	22	1	8.91	12.72
3090	5	5	22	2	9.11	12.17
3096	5	5	22	3	9.30	11.70
3102	5	5	22	4	9.20	11.36
3108	5	5	22	5	9.17	11.31
3114	5	5	22	6	9.31	11.58
3120	5	5	22	7	8.79	12.02
3126	5	5	22	8	8.66	12.54
3132	5	5	22	9	8.47	13.01
3138	5	5	22	10	8.46	13.33
3144	5	5	22	11	9.16	13.40
3150	5	5	22	12	10.67	13.18
3156	5	5	22	13	10.25	12.78
3162	5	5	22	14	8.98	12.31
3168	5	5	22	15	9.28	11.87
3174	5	5	22	16	9.28	11.54
3180	5	5	22	17	9.52	11.44
3186	5	5	22	18	9.53	11.67
3192	5	5	22	19	9.05	12.12
3198	5	5	22	20	8.58	12.65
3204	5	5	22	21	8.48	13.20
3210	5	5	22	22	8.49	13.56
3216	5	5	22	23	8.49	13.73
3222	5	5	23	0	9.89	13.48
3228	5	5	23	1	9.27	13.06
3234	5	5	23	2	8.69	12.55
3240	5	5	23	3	8.97	12.03
3246	5	5	23	4	9.22	11.54
3252	5	5	23	5	9.20	11.22
3258	5	5	23	6	9.50	11.24
3264	5	5	23	7	9.18	11.60
3270	5	5	23	8	8.70	12.06
3276	5	5	23	9	8.59	12.61
3282	5	5	23	10	8.63	13.06

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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3288	5	5	23	11	8.72	13.35
3294	5	5	23	12	8.91	13.36
3300	5	5	23	13	10.53	13.07
3306	5	5	23	14	10.09	12.63
3312	5	5	23	15	8.93	12.17
3318	5	5	23	16	9.34	11.75
3324	5	5	23	17	9.46	11.47
3330	5	5	23	18	9.13	11.47
3336	5	5	23	19	9.33	11.79
3342	5	5	23	20	8.92	12.31
3348	5	5	23	21	8.94	12.92
3354	5	5	23	22	9.13	13.45
3360	5	5	23	23	9.22	13.81
3366	5	5	24	0	9.16	13.87
3372	5	5	24	1	9.95	13.53
3378	5	5	24	2	9.82	13.07
3384	5	5	24	3	9.19	12.52
3390	5	5	24	4	9.03	12.00
3396	5	5	24	5	9.09	11.55
3402	5	5	24	6	9.27	11.31
3408	5	5	24	7	9.50	11.42
3414	5	5	24	8	9.67	11.84
3420	5	5	24	9	9.09	12.34
3426	5	5	24	10	9.19	12.89
3432	5	5	24	11	9.30	13.32
3438	5	5	24	12	9.81	13.54
3444	5	5	24	13	10.37	13.46
3450	5	5	24	14	10.82	13.13
3456	5	5	24	15	9.50	12.68
3462	5	5	24	16	9.60	12.23
3468	5	5	24	17	9.24	11.84
3474	5	5	24	18	9.35	11.61
3480	5	5	24	19	9.72	11.67
3486	5	5	24	20	10.06	12.10
3492	5	5	24	21	9.77	12.60
3498	5	5	24	22	9.40	13.19
3504	5	5	24	23	9.90	13.71
3510	5	5	25	0	10.77	14.00
3516	5	5	25	1	10.87	13.96

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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3522	5	5	25	2	10.54	13.57
3528	5	5	25	3	10.28	13.12
3534	5	5	25	4	10.34	12.59
3540	5	5	25	5	10.50	12.09
3546	5	5	25	6	10.28	11.69
3552	5	5	25	7	10.36	11.60
3558	5	5	25	8	10.24	11.79
3564	5	5	25	9	10.18	12.22
3570	5	5	25	10	10.28	12.75
3576	5	5	25	11	10.13	13.27
3582	5	5	25	12	10.22	13.64
3588	5	5	25	13	10.33	13.77
3594	5	5	25	14	10.37	13.53
3600	5	5	25	15	10.33	13.12
3606	5	5	25	16	10.28	12.62
3612	5	5	25	17	10.00	12.16
3618	5	5	25	18	10.07	11.77
3624	5	5	25	19	10.15	11.56
3630	5	5	25	20	10.31	11.68
3636	5	5	25	21	10.78	12.11
3642	5	5	25	22	10.37	12.64
3648	5	5	25	23	10.38	13.21
3654	5	5	26	0	10.34	13.70
3660	5	5	26	1	10.42	14.01
3666	5	5	26	2	10.41	13.95
3672	5	5	26	3	10.48	13.61
3678	5	5	26	4	10.44	13.18
3684	5	5	26	5	10.64	12.67
3690	5	5	26	6	10.38	12.15
3696	5	5	26	7	10.36	11.81
3702	5	5	26	8	10.45	11.64
3708	5	5	26	9	10.45	11.77
3714	5	5	26	10	10.75	12.11
3720	5	5	26	11	10.89	12.56
3726	5	5	26	12	10.40	12.99
3732	5	5	26	13	10.43	13.29
3738	5	5	26	14	10.43	13.39
3744	5	5	26	15	10.41	13.19
3750	5	5	26	16	10.47	12.81

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Station MG-3
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3756	5	5	26	17	10.50	12.35
3762	5	5	26	18	10.64	11.91
3768	5	5	26	19	10.69	11.58
3774	5	5	26	20	10.74	11.47
3780	5	5	26	21	10.85	11.68
3786	5	5	26	22	10.63	12.16
3792	5	5	26	23	10.57	12.69
3798	5	5	27	0	10.47	13.23
3804	5	5	27	1	10.43	13.64
3810	5	5	27	2	10.39	13.82
3816	5	5	27	3	10.39	13.66
3822	5	5	27	4	10.49	13.28
3828	5	5	27	5	10.55	12.79
3834	5	5	27	6	10.44	12.23
3840	5	5	27	7	10.45	11.73
3846	5	5	27	8	10.39	11.35
3852	5	5	27	9	10.38	11.24
3858	5	5	27	10	10.46	11.48
3864	5	5	27	11	10.52	11.93
3870	5	5	27	12	10.47	12.43
3876	5	5	27	13	10.50	12.92
3882	5	5	27	14	10.41	13.27
3888	5	5	27	15	10.31	13.38
3894	5	5	27	16	10.35	13.18
3900	5	5	27	17	10.49	12.80
3906	5	5	27	18	10.60	12.35
3912	5	5	27	19	10.47	11.97
3918	5	5	27	20	10.35	11.61
3924	5	5	27	21	10.52	11.49
3930	5	5	27	22	10.47	11.67
3936	5	5	27	23	10.71	12.05
3942	5	5	28	0	10.51	12.53
3948	5	5	28	1	9.97	13.05
3954	5	5	28	2	9.93	13.40
3960	5	5	28	3	9.96	13.60
3966	5	5	28	4	9.95	13.47
3972	5	5	28	5	9.97	13.12
3978	5	5	28	6	10.26	12.63
3984	5	5	28	7	10.35	12.15

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Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
3990	5	5	28	8	10.38	11.69
3996	5	5	28	9	10.39	11.33
4002	5	5	28	10	10.50	11.26
4008	5	5	28	11	10.61	11.54
4014	5	5	28	12	10.68	11.99
4020	5	5	28	13	9.98	12.45
4026	5	5	28	14	9.86	12.96
4032	5	5	28	15	9.87	13.29
4038	5	5	28	16	9.96	13.38
4044	5	5	28	17	9.91	13.18
4050	5	5	28	18	9.96	12.81
4056	5	5	28	19	10.13	12.37
4062	5	5	28	20	10.21	11.99
4068	5	5	28	21	10.27	11.61
4074	5	5	28	22	10.45	11.47
4080	5	5	28	23	10.32	11.61
4086	5	5	29	0	10.59	11.94
4092	5	5	29	1	9.96	12.41
4098	5	5	29	2	9.87	12.91
4104	5	5	29	3	9.86	13.28
4110	5	5	29	4	9.93	13.49
4116	5	5	29	5	10.00	13.39
4122	5	5	29	6	10.36	13.04
4128	5	5	29	7	10.17	12.61
4134	5	5	29	8	10.27	12.14
4140	5	5	29	9	10.20	11.71
4146	5	5	29	10	10.38	11.37
4152	5	5	29	11	10.55	11.29
4158	5	5	29	12	10.25	11.56
4164	5	5	29	13	10.13	11.96
4170	5	5	29	14	9.96	12.46
4176	5	5	29	15	9.98	12.92
4182	5	5	29	16	10.04	13.26
4188	5	5	29	17	10.22	13.37
4194	5	5	29	18	11.07	13.20
4200	5	5	29	19	10.95	12.84
4206	5	5	29	20	10.67	12.41
4212	5	5	29	21	10.36	12.01
4218	5	5	29	22	10.39	11.65

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Station MG-3
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Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4224	5	5	29	23	10.28	11.49
4230	5	5	30	0	10.32	11.57
4236	5	5	30	1	10.38	11.90
4242	5	5	30	2	10.05	12.37
4248	5	5	30	3	10.00	12.85
4254	5	5	30	4	10.09	13.21
4260	5	5	30	5	10.17	13.43
4266	5	5	30	6	10.20	13.37
4272	5	5	30	7	11.06	13.07
4278	5	5	30	8	10.75	12.65
4284	5	5	30	9	10.41	12.18
4290	5	5	30	10	10.43	11.75
4296	5	5	30	11	10.47	11.43
4302	5	5	30	12	10.54	11.36
4308	5	5	30	13	10.66	11.63
4314	5	5	30	14	10.34	12.04
4320	5	5	30	15	10.08	12.50
4326	5	5	30	16	10.18	12.97
4332	5	5	30	17	10.08	13.29
4338	5	5	30	18	10.23	13.41
4344	5	5	30	19	11.79	13.24
4350	5	5	30	20	11.31	12.91
4356	5	5	30	21	10.78	12.51
4362	5	5	30	22	10.85	12.06
4368	5	5	30	23	10.62	11.67
4374	5	5	31	0	10.60	11.47
4380	5	5	31	1	10.46	11.53
4386	5	5	31	2	10.71	11.84
4392	5	5	31	3	10.18	12.28
4398	5	5	31	4	10.05	12.75
4404	5	5	31	5	10.06	13.13
4410	5	5	31	6	10.31	13.36
4416	5	5	31	7	10.93	13.33
4422	5	5	31	8	11.50	13.03
4428	5	5	31	9	10.91	12.64
4434	5	5	31	10	10.44	12.20
4440	5	5	31	11	10.55	11.81
4446	5	5	31	12	10.61	11.53
4452	5	5	31	13	10.83	11.47

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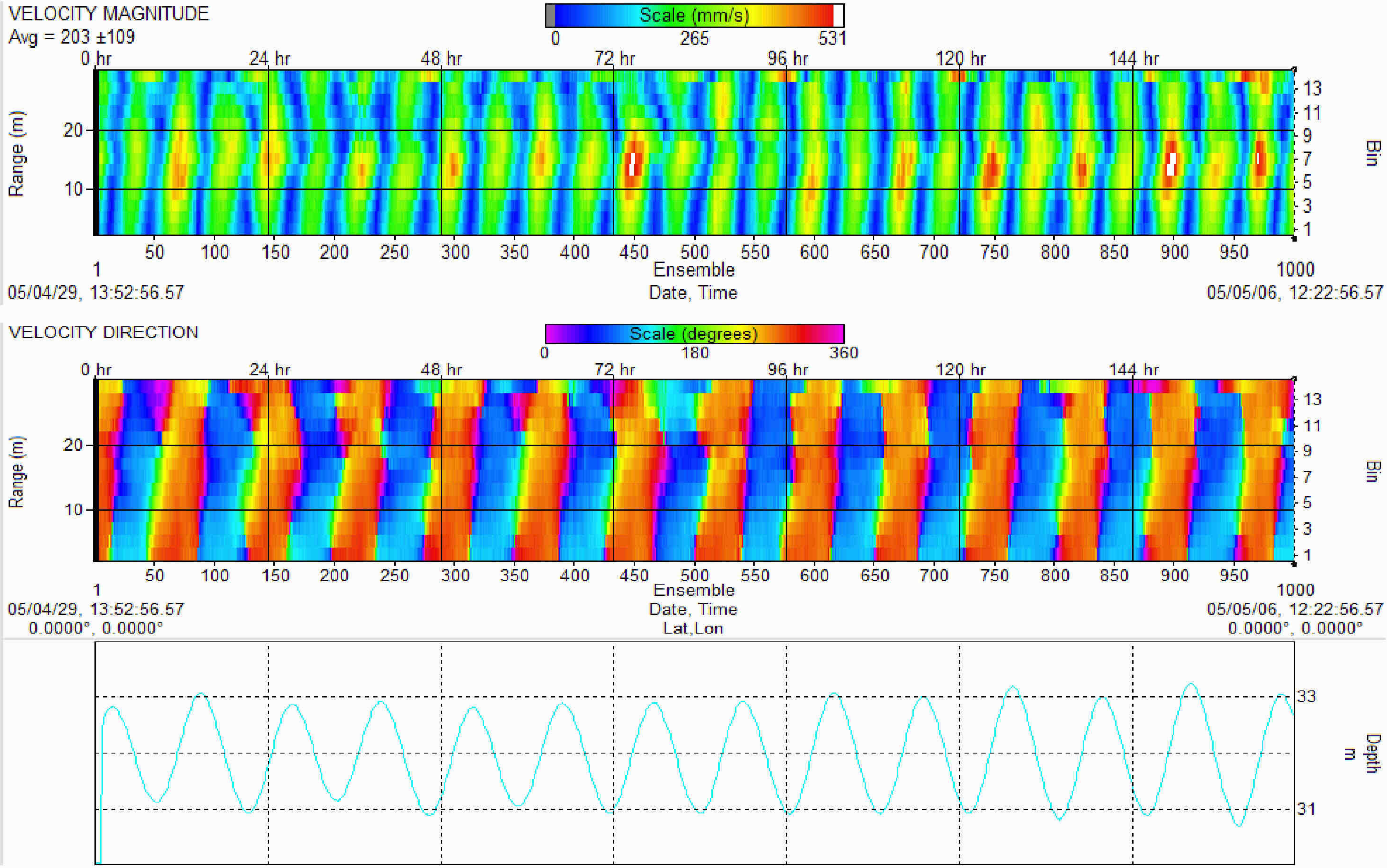
Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4458	5	5	31	14	11.03	11.70
4464	5	5	31	15	10.43	12.15
4470	5	5	31	16	10.06	12.62
4476	5	5	31	17	10.10	13.07
4482	5	5	31	18	10.11	13.41
4488	5	5	31	19	10.21	13.53
4494	5	5	31	20	11.58	13.33
4500	5	5	31	21	11.01	12.99
4506	5	5	31	22	10.67	12.57
4512	5	5	31	23	10.63	12.12
4518	5	6	1	0	10.65	11.71
4524	5	6	1	1	10.69	11.47
4530	5	6	1	2	10.64	11.49
4536	5	6	1	3	11.07	11.79
4542	5	6	1	4	10.51	12.21
4548	5	6	1	5	10.15	12.68
4554	5	6	1	6	10.16	13.07
4560	5	6	1	7	10.16	13.31
4566	5	6	1	8	11.39	13.29
4572	5	6	1	9	11.28	13.02
4578	5	6	1	10	10.77	12.66
4584	5	6	1	11	10.64	12.24
4590	5	6	1	12	10.68	11.84
4596	5	6	1	13	10.71	11.55
4602	5	6	1	14	10.77	11.49
4608	5	6	1	15	10.84	11.75
4614	5	6	1	16	10.54	12.19
4620	5	6	1	17	10.37	12.67
4626	5	6	1	18	10.32	13.13
4632	5	6	1	19	10.32	13.45
4638	5	6	1	20	11.16	13.55
4644	5	6	1	21	11.91	13.33
4650	5	6	1	22	11.07	12.95
4656	5	6	1	23	10.48	12.48
4662	5	6	2	0	10.88	12.04
4668	5	6	2	1	10.80	11.61
4674	5	6	2	2	10.82	11.37
4680	5	6	2	3	10.90	11.40
4686	5	6	2	4	10.97	11.70

AQUA SURVEY, INC.
ADCP
Hourly Bottom Temperatures And Depths
E & E Broadwater

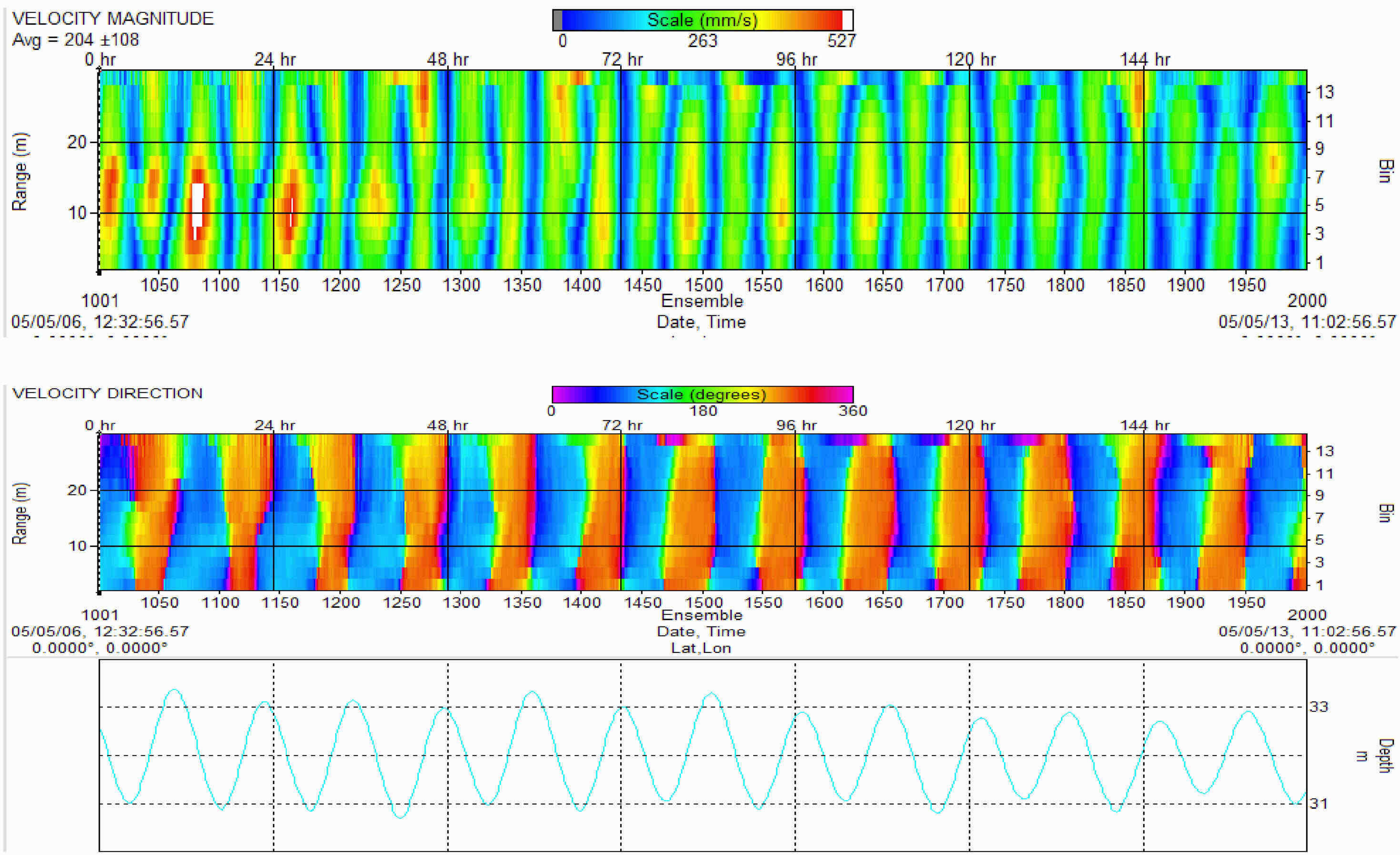
Station MG-3
4/30 to 6/2

Ensemble	Yr	Month	Day	Hour	Temp Deg (C)	Depth Meters
4692	5	6	2	5	10.58	12.16
4698	5	6	2	6	10.39	12.62
4704	5	6	2	7	10.40	12.99
4710	5	6	2	8	10.40	13.24
4716	5	6	2	9	10.66	13.22
4722	5	6	2	10	11.96	12.94
4728	5	6	2	11	11.04	12.55



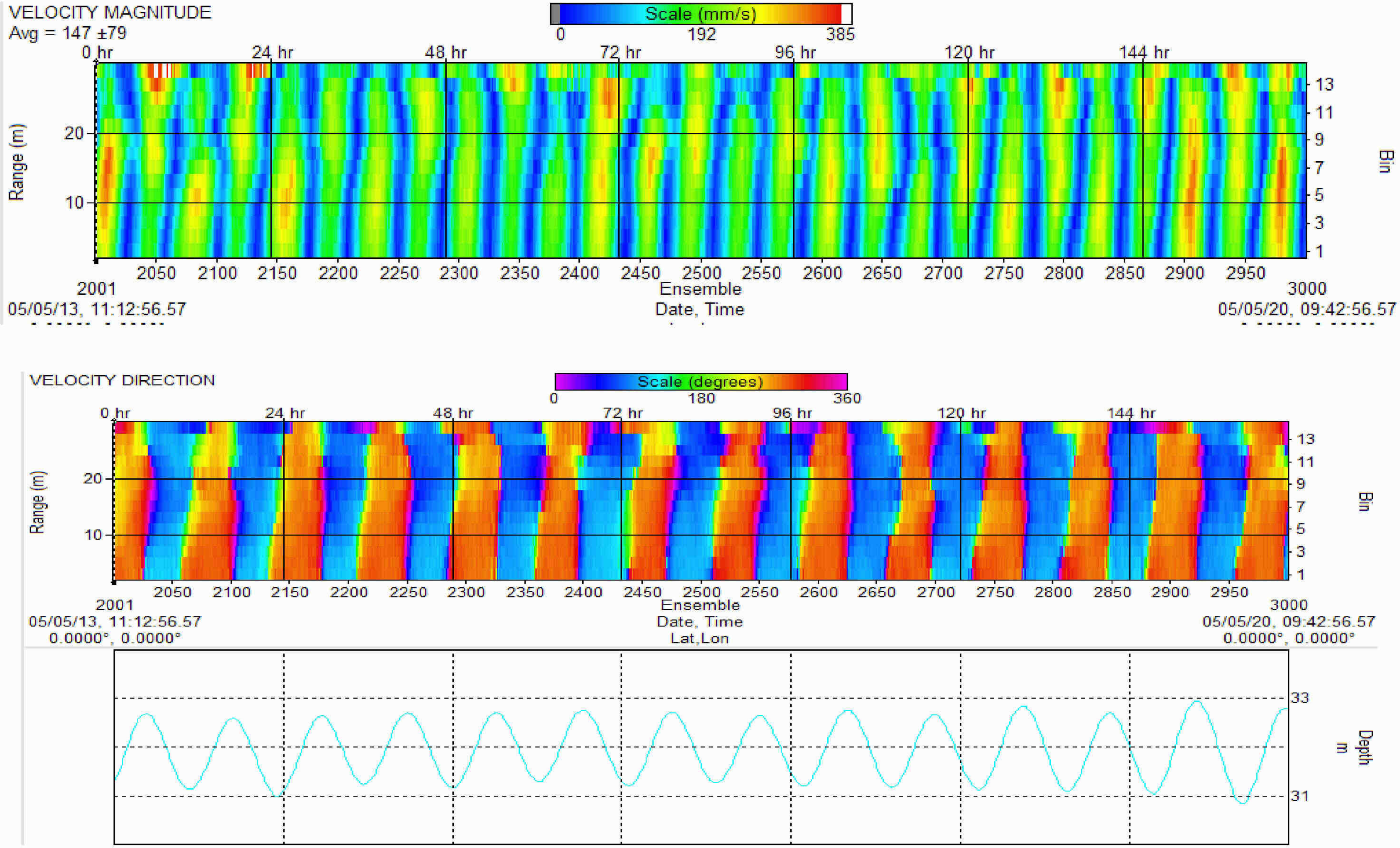
C-1 Ensemble 1 to 1000

Aqua Survey Inc.



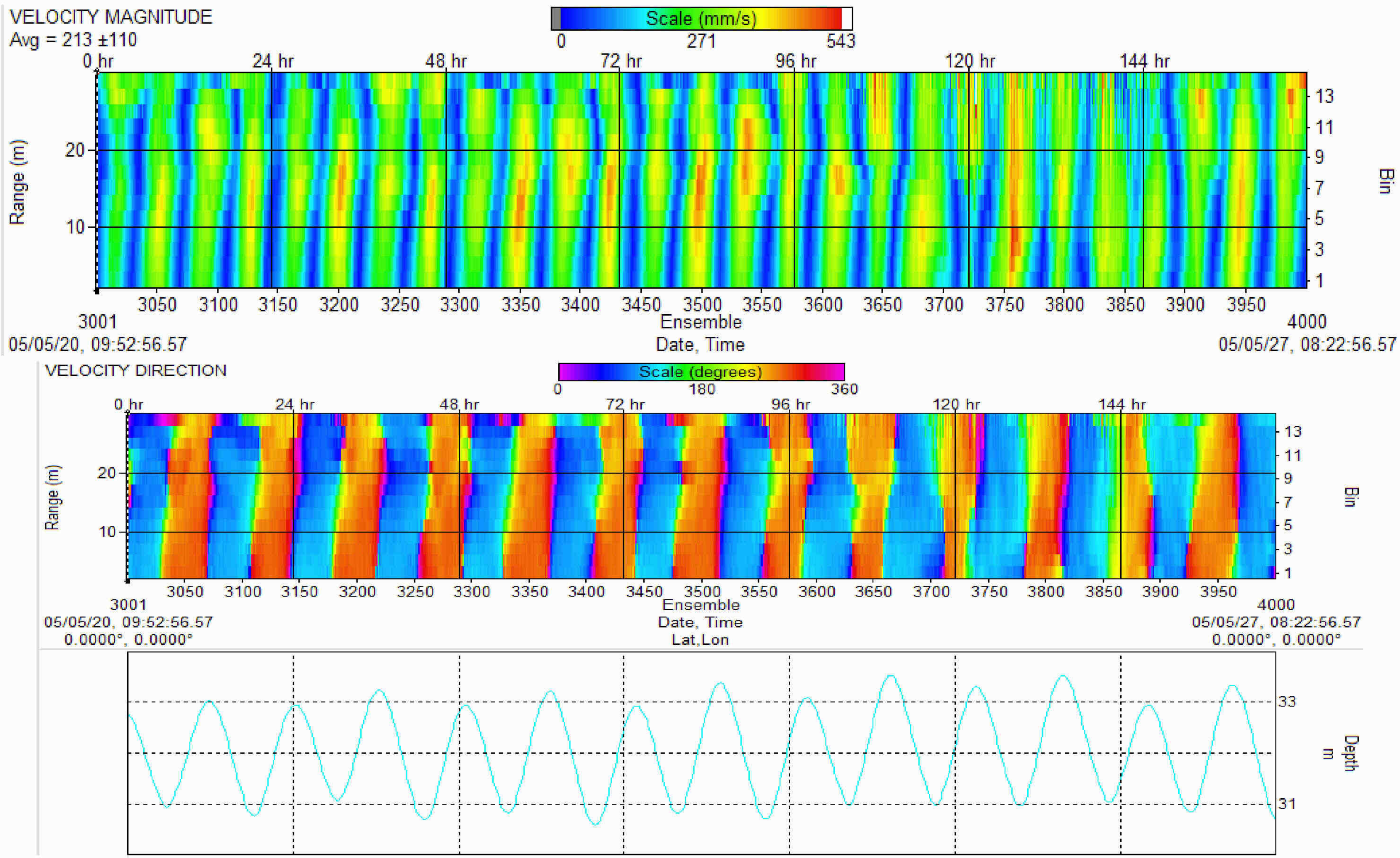
C-1 Ensemble 1001 to 2000

Aqua Survey Inc.



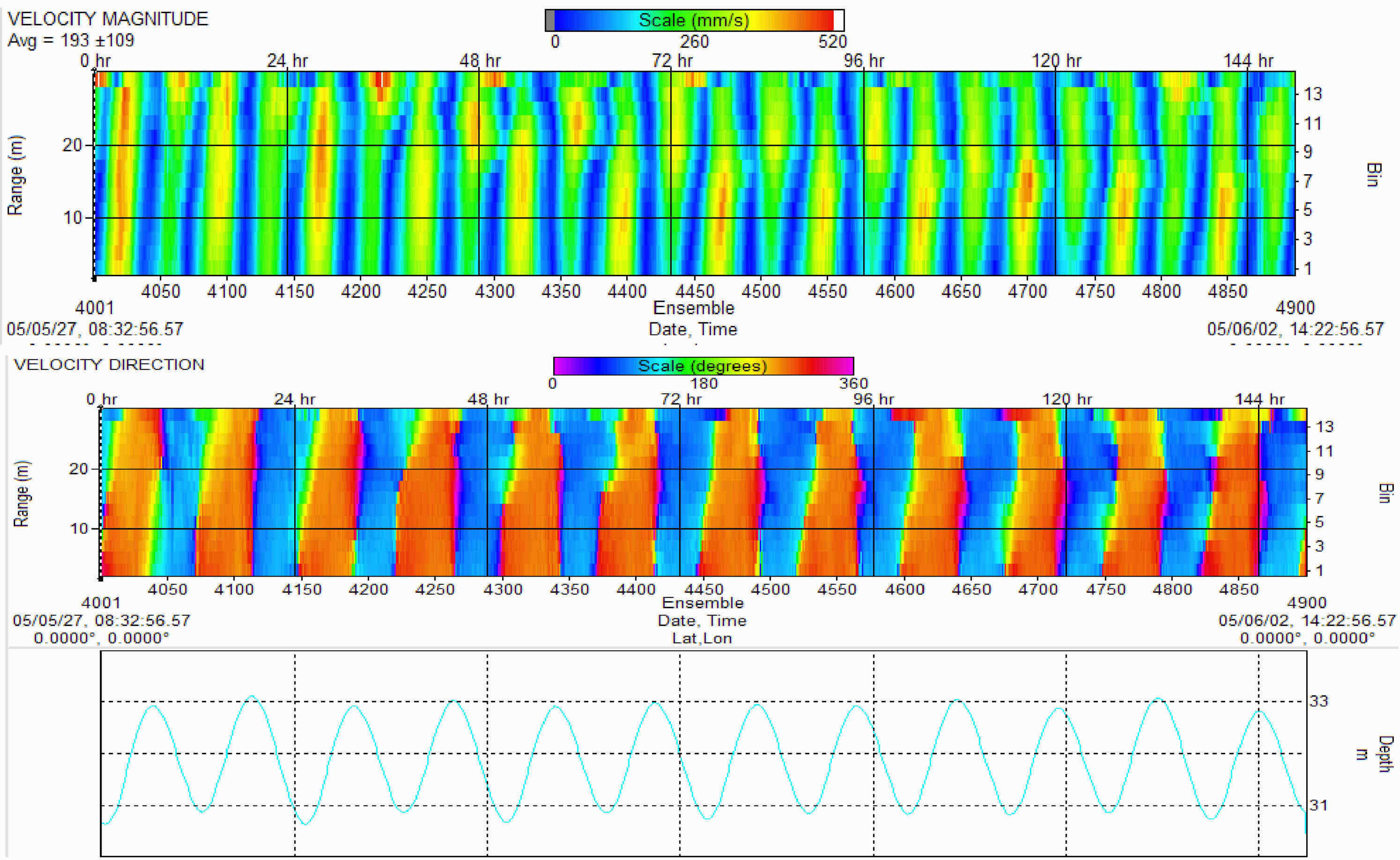
C-1 Ensemble 2001 to 3000

Aqua Survey Inc.



C-1 Ensemble 3001 to 4000

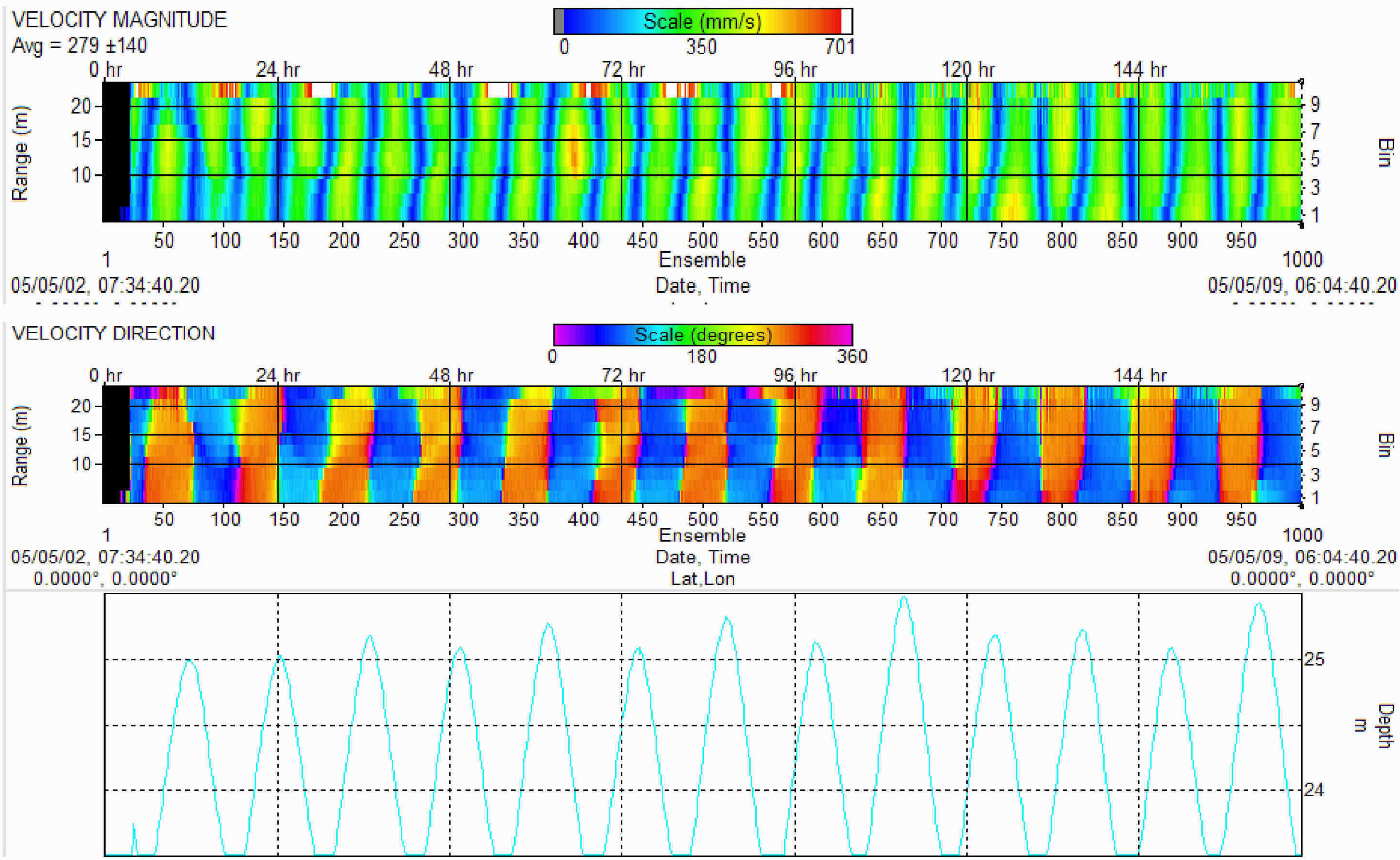
Aqua Survey Inc.



C-1 Ensemble 4001 to 4900

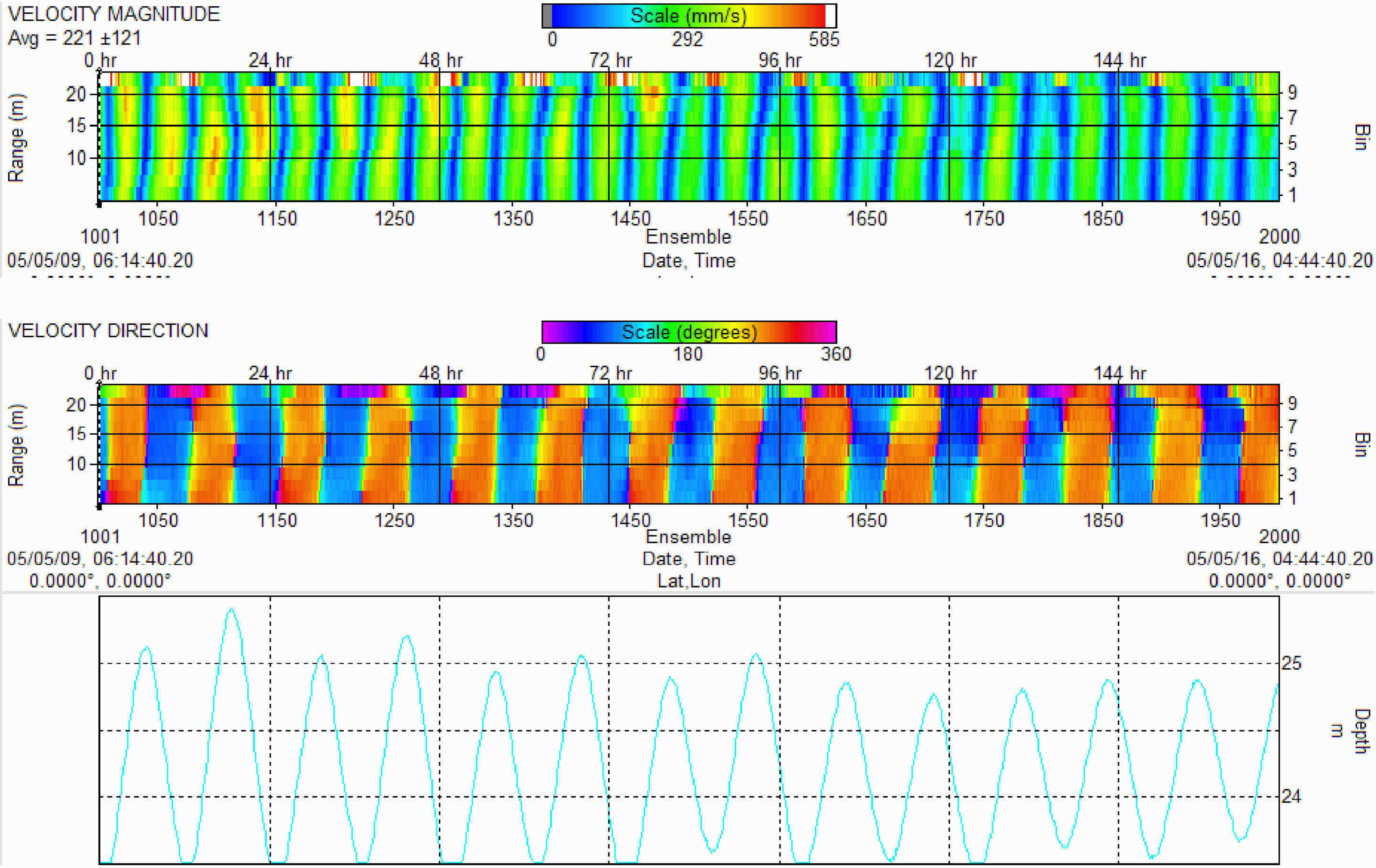
Aqua Survey Inc.

BW000444



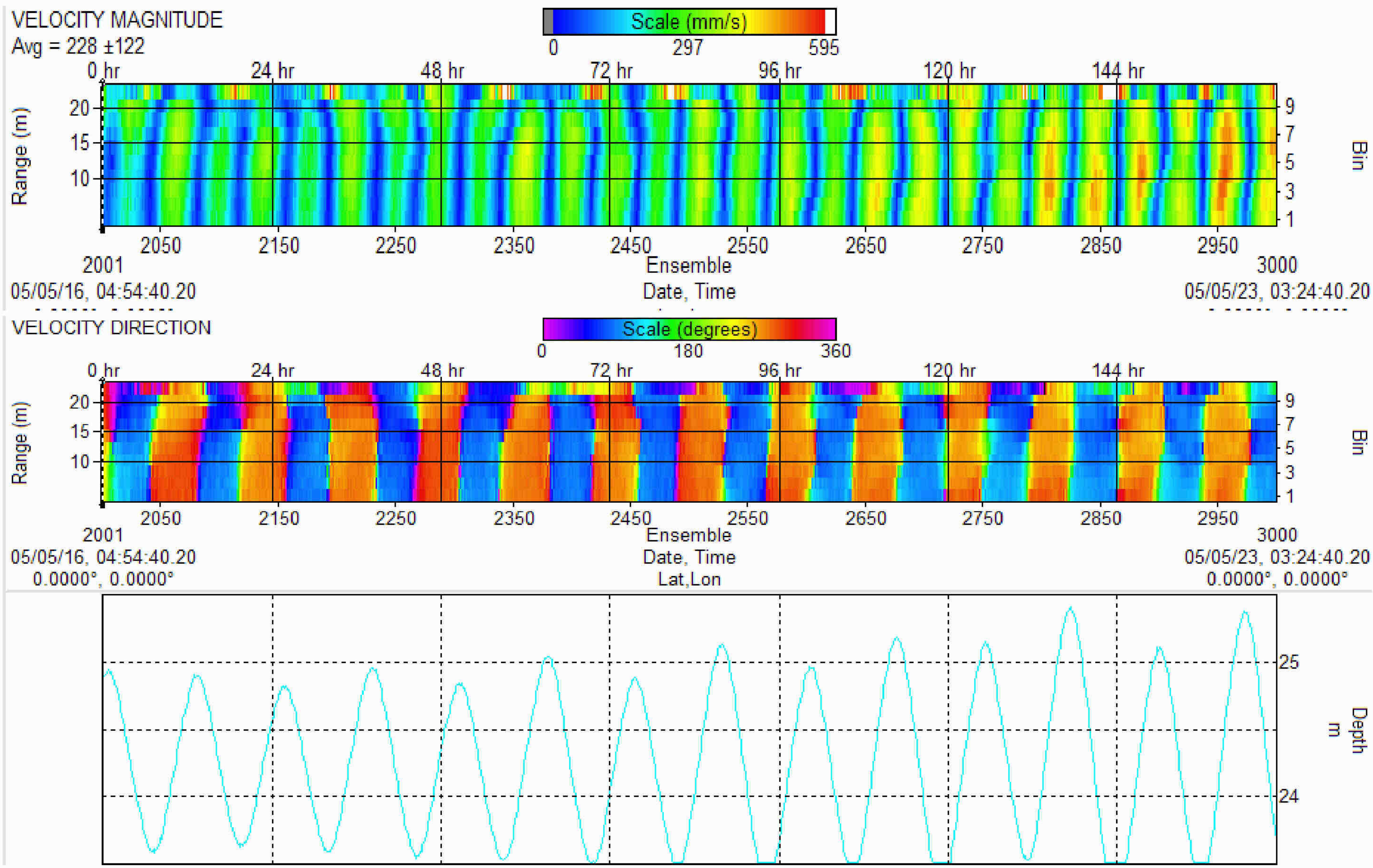
C-28 Ensemble 1 to 1000

Aqua Survey Inc.



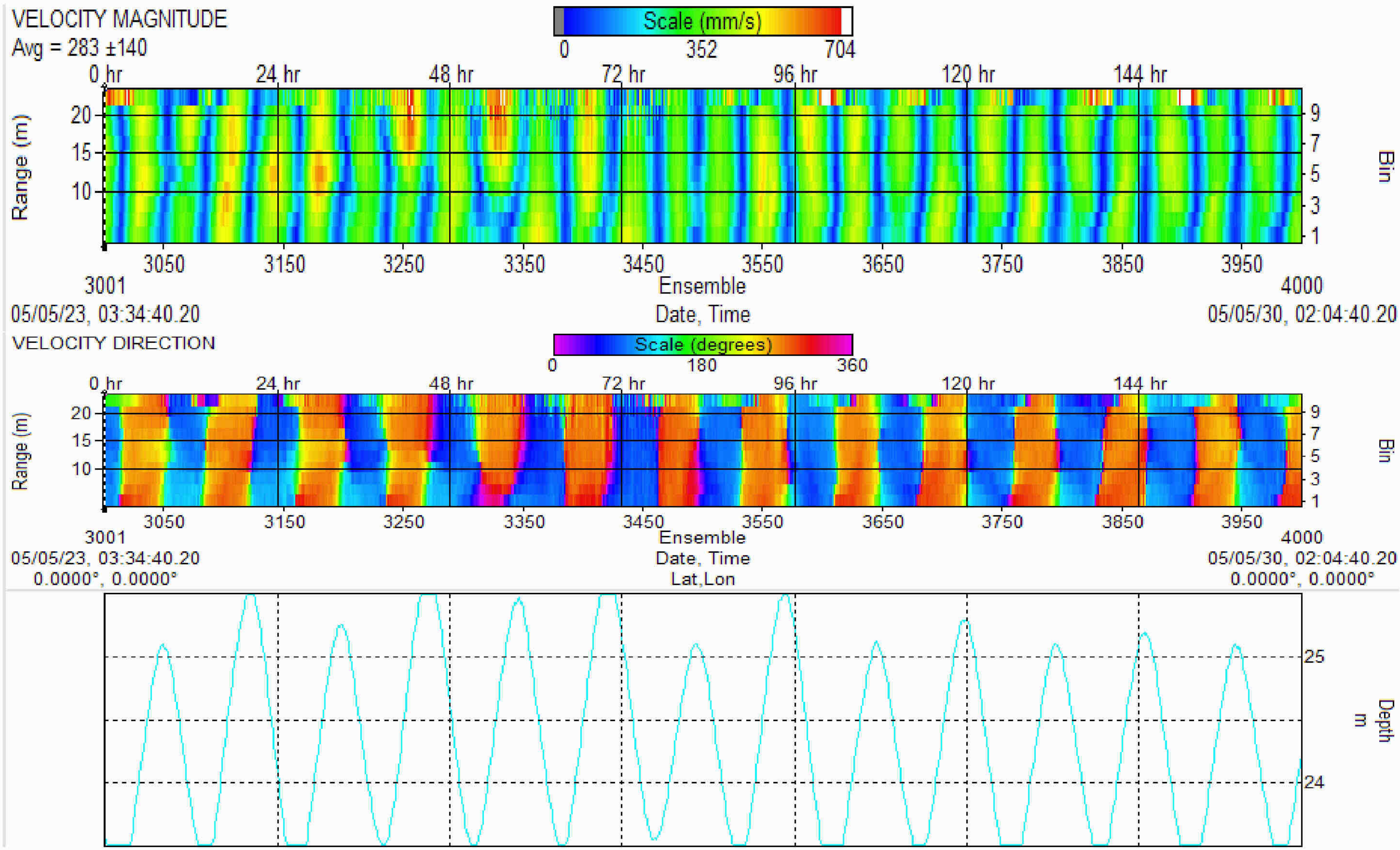
C-28 Ensemble 1001 to 2000

Aqua
Survey
Inc.



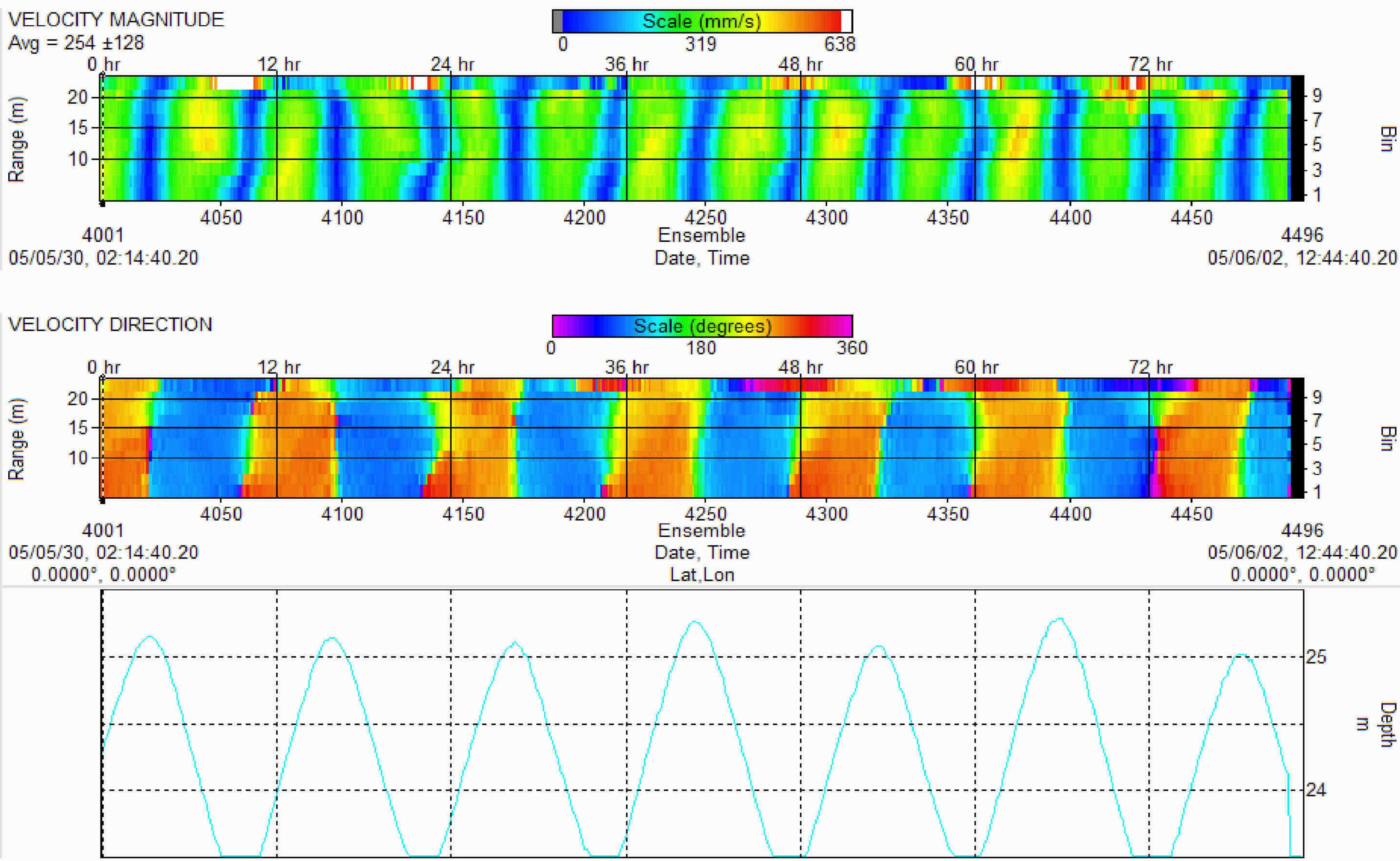
C-28 Ensemble 2001 to 3000

Aqua Survey Inc.



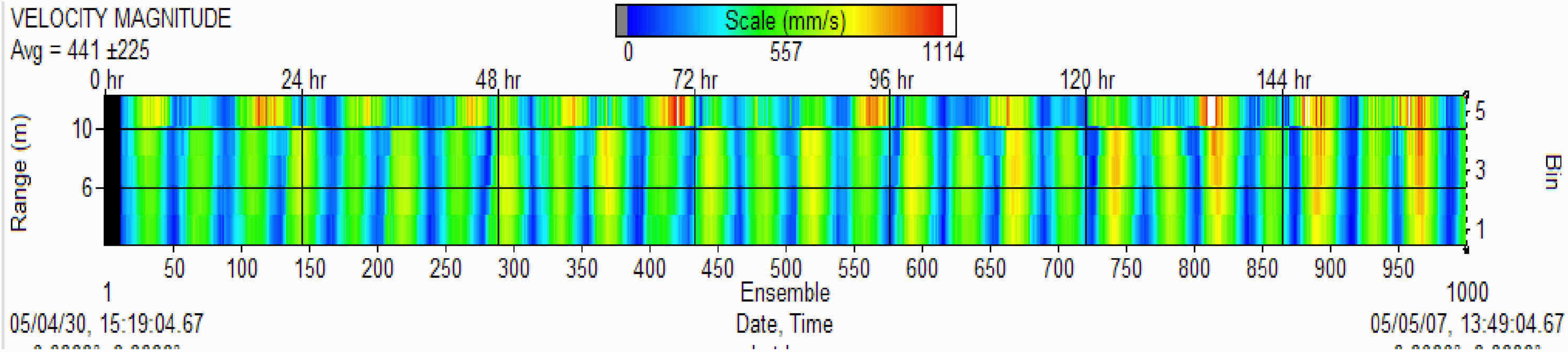
C-28 Ensemble 3001 to 4000

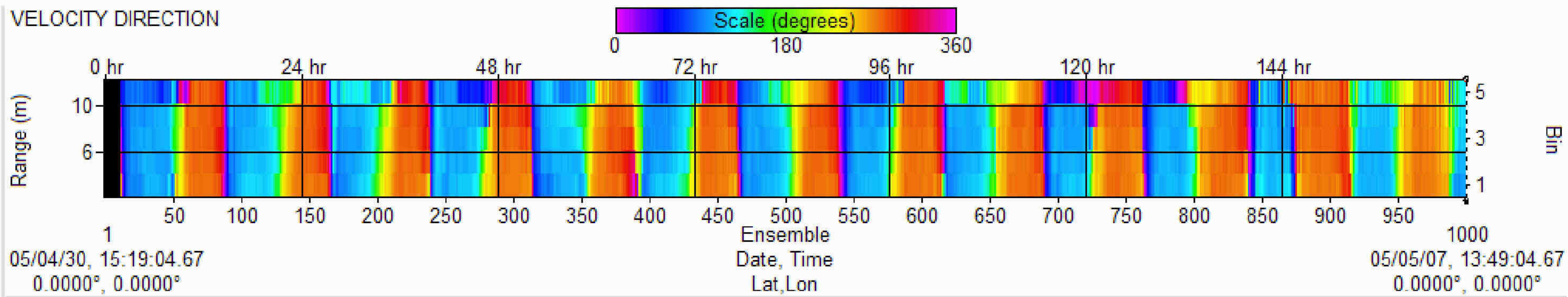
Aqua Survey Inc.

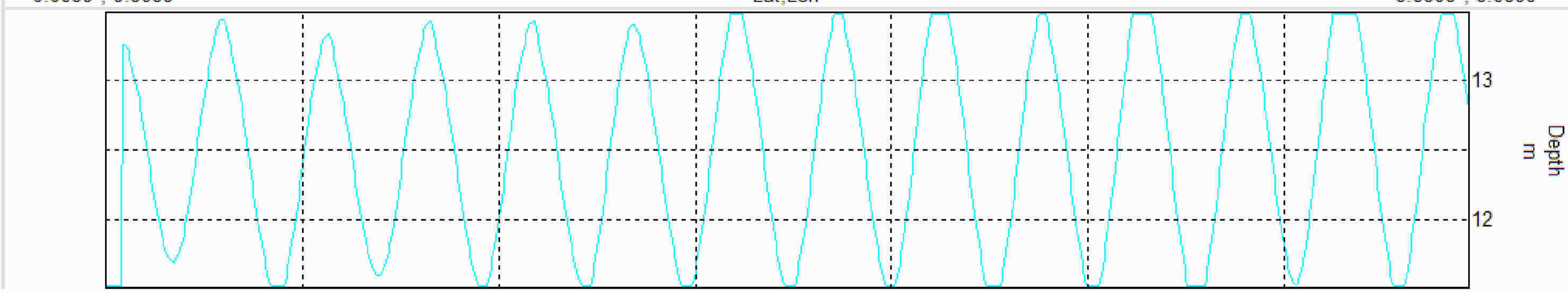


C-28 Ensemble 4001 to 4496

Aqua Survey Inc.

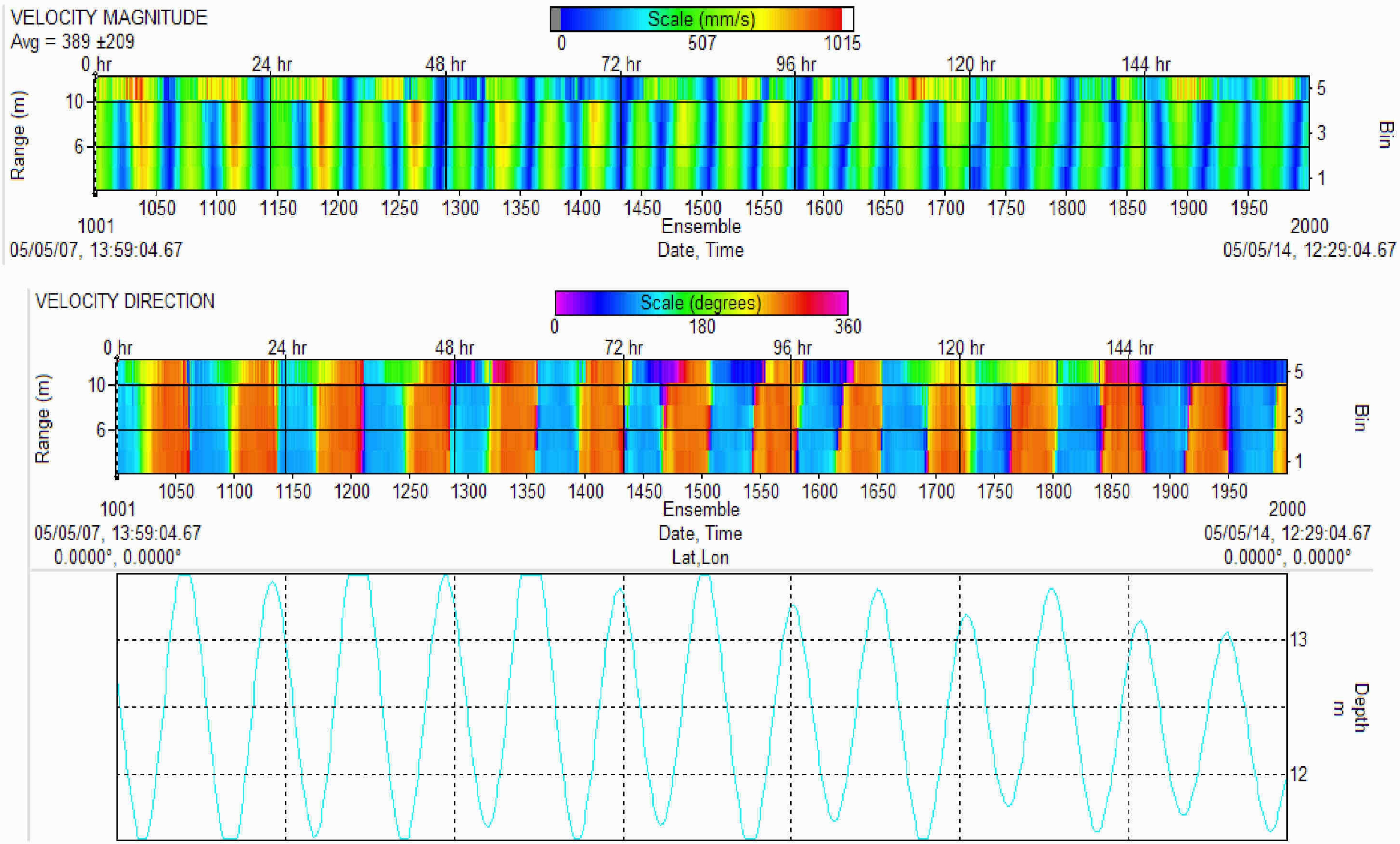






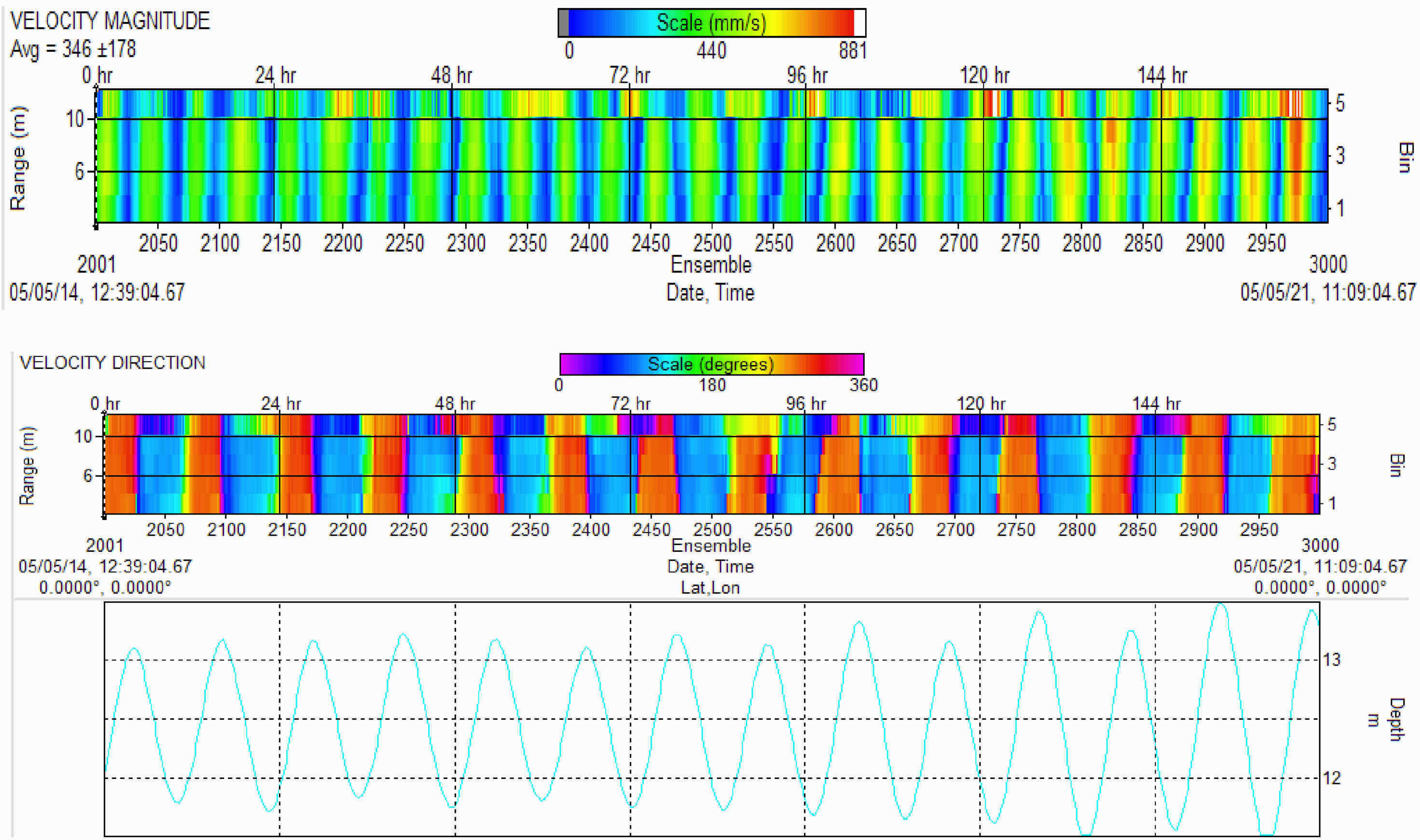
MG-3 Ensemble 1 to 1000

Aqua Survey Inc.



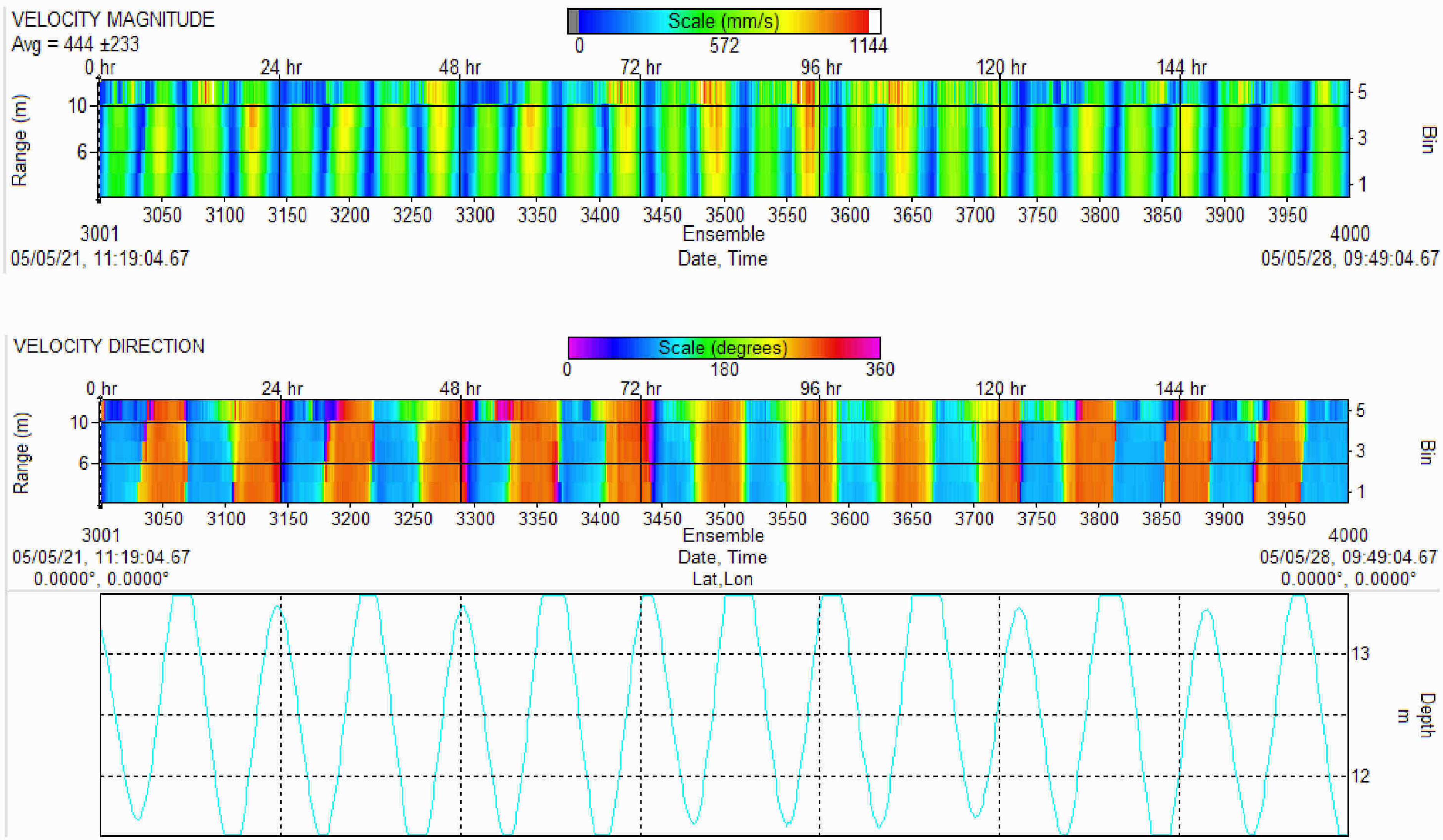
MG-3 Ensemble 1001 to 2000

Aqua Survey Inc.



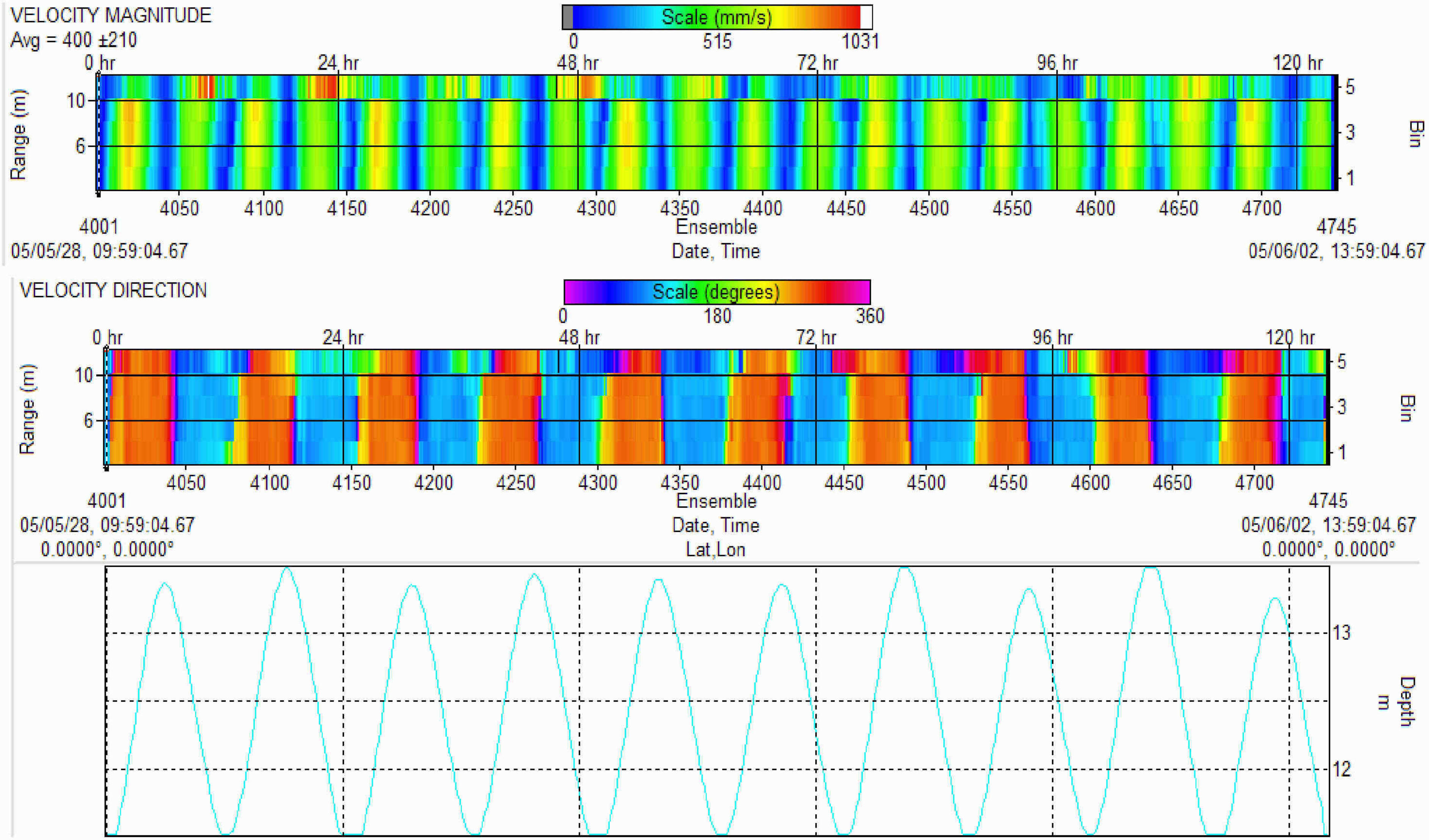
MG-3 Ensemble 2001 to 3000

Aqua Survey Inc.



MG-3 Ensemble 3001 to 4000

Aqua Survey Inc.



MG-3 Ensemble 4001 to 4745

Aqua
Survey
Inc.

G

Data Validation Memos

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-3755
Broadwater Energy	A05-3780
Broadwater Energy	A05-3867

Sediment samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Knoxville for dioxin, and STL Burlington for total organic carbon, and salinity. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 1211 reported values in this sample delivery group (SDG), 44 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. All samples were analyzed with holding times.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of dioxins, and unknowns were flagged “U” as non-detected as indicated on Table 2A. The other dioxin results slightly above the blank levels were flagged “J” as estimated. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Several ketones were detected in the method blank, but not the samples. Acetone was detected in sample ENV-2 at low levels. Although acetone was not detected in the associated method blank, acetone was detected in two other method blanks and the positive result in this sample may be considered suspect.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blank are summarized in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent

recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable.

Laboratory Duplicate or Matrix Spike Duplicates

Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable except as noted on Tables 4 and 5. Mercury had a slightly high RPD. The associated results were qualified "J" as estimated.

Initial Calibration

In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration

In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution/Reanalysis

Samples for PCB and SVOC analysis were re-extracted and analyzed within project holding time to adjust extraction weight for sample moisture. The samples are indicated on Table 6.

Field Duplicates

Consistency in both sample collection and sample analysis is checked through analysis of duplicate samples. Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. Table 7 lists the duplicate samples and the original samples they duplicated. Field duplicate, ENV-3D-D4-5, was not analyzed for Salinity due to laboratory oversight. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified "J" as estimated.

The sediment samples collected in duplicate show good precision for all parameters except TOC, toluene and low level dioxin. Some dioxin results were later qualified "U" as non-detect due to blank contamination. The associated sample results are flagged "J".

Tentatively Identified Compounds

The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as "NJ" with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The only significant TICs indicate low level hydrocarbon contaminant in some samples including ENV-1, ENV-2, ENV-3D, and ENV-4. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL
HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-3755	SOIL	ENV-5	A5375501	4/17/2005			None
A05-3755	SOIL	ENV-5	A5375501MS	4/17/2005	MS/MSD		None
A05-3755	SOIL	ENV-5	A5375501RE	4/17/2005			None
A05-3755	SOIL	ENV-5	A5375501SD	4/17/2005	MS/MSD		None
A05-3755	SOIL	ENV-5-D4-5	A5375502	4/17/2005			None
A05-3755	SOIL	ENV-4	A5375503	4/17/2005			None
A05-3755	SOIL	ENV-4	A5375503MS	4/17/2005	MS/MSD		None
A05-3755	SOIL	ENV-4	A5375503RE	4/17/2005			None
A05-3755	SOIL	ENV-4	A5375503SD	4/17/2005	MS/MSD		None
A05-3755	SOIL	ENV-4-D4-5	A5375504	4/17/2005			None
A05-3755	SOIL	ENV-3	A5375505	4/17/2005			None
A05-3755	SOIL	ENV-3	A5375505RE	4/17/2005			None
A05-3755	SOIL	ENV-3-D4-5	A5375506	4/17/2005			None
A05-3755	SOIL	ENV-3D	A5375507	4/17/2005			None
A05-3755	SOIL	ENV-3D	A5375507RE	4/17/2005			None
A05-3755	SOIL	ENV-3D-D4-5	A5375508	4/17/2005			None
A05-3755	SOIL	ENV-2	A5375509	4/17/2005			None
A05-3755	SOIL	ENV-2	A5375509RE	4/17/2005			None
A05-3755	SOIL	ENV-2-D4-5	A5375510	4/17/2005			None
A05-3755	SOIL	C-9	A5375511	4/18/2005			None
A05-3755	SOIL	C-9	A5375511RE	4/18/2005			None
A05-3755	SOIL	C-9-D4-5	A5375512	4/18/2005			None
A05-3755	SOIL	ENV-1	A5375513	4/18/2005			None
A05-3755	SOIL	ENV-1	A5375513RE	4/18/2005			None
A05-3755	SOIL	ENV-1-D4-5	A5375514	4/18/2005			None
A05-3755	SOIL	ENV-1-D4-5	A5375514MS	4/18/2005	MS/MSD		None
A05-3780	SOIL	ENV-3-D1-3	A5378003	4/17/2005			None
A05-3780	SOIL	ENV-3D-D1-3	A5378007	4/17/2005			None
A05-3867	SOIL	ENV-5	A5386701	4/17/2005			None
A05-3867	SOIL	ENV-5-D4-5	A5386702	4/17/2005			None
A05-3867	SOIL	ENV-4	A5386703	4/17/2005			None
A05-3867	SOIL	ENV-4-D4-5	A5386704	4/17/2005			None

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-3867	SOIL	ENV-3	A5386705	4/17/2005			None
A05-3867	SOIL	ENV-3-D4-5	A5386706	4/17/2005			None
A05-3867	SOIL	ENV-2	A5386707	4/17/2005			None
A05-3867	SOIL	ENV-2-D4-5	A5386708	4/17/2005			None
A05-3867	SOIL	C-9	A5386709	4/18/2005			None
A05-3867	SOIL	C-9-D4-5	A5386710	4/18/2005			None
A05-3867	SOIL	ENV-1	A5386711	4/18/2005			None
A05-3867	SOIL	ENV-1-D4-5	A5386712	4/18/2005			None
A05-3867	SOIL	ENV-3D	A5386713	4/17/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-3755	SOIL	E353.2	E353.2 Nitrate/Nitrite	7	SAMP
A05-3755	SOIL	SW6010	SW6010 Metals Total	7	SAMP
A05-3755	SOIL	SW7471	SW7471 Mercury Total	7	SAMP
A05-3755	SOIL	SW8081	SW8081 Pesticides	7	SAMP
A05-3755	SOIL	SW8082	SW8082 PCBs	6	RA
A05-3755	SOIL	SW8082	SW8082 PCBs	1	SAMP
A05-3755	SOIL	SW8260	SW8260 Volatiles	7	SAMP
A05-3755	SOIL	SW8270	SW8270 SemiVolatiles	6	RA
A05-3755	SOIL	SW8270	SW8270 SemiVolatiles	1	SAMP
A05-3755	SOIL	SW9045	SW9045 pH	7	SAMP
A05-3755	SOIL	SW9056	SW9056 Anions	7	SAMP
A05-3780	SOIL	SM1613B	SM1613B Dioxins	2	SAMP
A05-3867	SOIL	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	7	SAMP
A05-3867	SOIL	SM2520	SM2520 Salinity	6	SAMP

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0566403	MBLK	TRIMETHYLSILANOL	6	JN	T	µg/Kg		
SW8260	A5B0566403	MBLK	UNK.BENZENEDICARBOXYLIC ACID	24	J	T	µg/Kg		
SW8260	A5B0566404	MBLK	Bromomethane	2	J	A	µg/Kg	1	5
SW8260	A5B0566404	MBLK	HEXANE	5	JN	T	µg/Kg		
SW8260	A5B0566404	MBLK	TRIMETHYLSILANOL	6	JN	T	µg/Kg		
SW8260	A5B0566404	MBLK	UNK.BENZENEDICARBOXYLIC ACID	10	J	T	µg/Kg		
SW8260	A5B0570602	MBLK	1,2,4-Trichlorobenzene	1	J	A	µg/Kg	0.9	5
SW8260	A5B0570602	MBLK	2-Hexanone	8	J	A	µg/Kg	5	25
SW8260	A5B0570602	MBLK	4-Methyl-2-pentanone	5	J	A	µg/Kg	4	25
SW8260	A5B0570602	MBLK	UNK.BENZENEDICARBOXYLIC ACID	10	J	T	µg/Kg		

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0566404	SOIL	HEXANE	5	5	BJN		ENV-3	U Flag
SW8260	A5B0570602	SOIL	UNK.BENZENEDICARBOXYLIC ACID	10	7	J		ENV-2	U Flag

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,4,6,7,8-HpCDD	0.000011	B	J
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,4,6,7,8-HpCDF	0.0000017	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,4,7,8-HxCDF	0.00000045	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,6,7,8-HxCDD	0.00000046	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,7,8,9-HxCDD	0.00000076	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,7,8-PeCDD	0.00000010	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	1,2,3,7,8-PeCDF	0.00000020	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	2,3,4,6,7,8-HxCDF	0.00000027	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	2,3,4,7,8-PeCDF	0.00000024	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	2,3,7,8-TCDF	0.00000059	BJ	U
A05-3780	SM1613B	ENV-3-D1-3	OCDD	0.00026	B	J

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-3780	SM1613B	ENV-3-D1-3	OCDF	0.0000033	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,4,6,7,8-HpCDD	0.0000045	BJ	J
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,4,6,7,8-HpCDF	0.0000014	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,4,7,8,9-HpCDF	0.00000017	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,4,7,8-HxCDD	0.00000010	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,4,7,8-HxCDF	0.00000042	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,6,7,8-HxCDD	0.00000022	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,6,7,8-HxCDF	0.00000019	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,7,8,9-HxCDD	0.00000029	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	1,2,3,7,8-PeCDF	0.00000016	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	2,3,4,6,7,8-HxCDF	0.000000082	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	2,3,4,7,8-PeCDF	0.00000023	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	2,3,7,8-TCDF	0.00000064	BJ	U
A05-3780	SM1613B	ENV-3D-D1-3	OCDD	0.000095	B	J
A05-3780	SM1613B	ENV-3D-D1-3	OCDF	0.0000014	BJ	U

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW7471	ENV-5	MSD	Mercury - Total	23.2	20	None

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed

Sample ID	Lab ID	Method	Sample Type	Action
ENV-5	A5375501RE	SW8270	RA	Reported
ENV-4	A5375503RE	SW8270	RA	Reported

Sample ID	Lab ID	Method	Sample Type	Action
ENV-4	A5375503RE	SW8082	RA	Reported
ENV-3	A5375505RE	SW8270	RA	Reported
ENV-3	A5375505RE	SW8082	RA	Reported
ENV-3D	A5375507RE	SW8270	RA	Reported
ENV-3D	A5375507RE	SW8082	RA	Reported
ENV-2	A5375509RE	SW8270	RA	Reported
ENV-2	A5375509RE	SW8082	RA	Reported
C-9	A5375511RE	SW8082	RA	Reported
ENV-1	A5375513RE	SW8270	RA	Reported
ENV-1	A5375513RE	SW8082	RA	Reported

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Anal Type	PQL	ENV-3	ENV-3D	RPD	RPD Rating	Samp Qual
SW8260	Carbon Disulfide	µg/Kg	A	5	2	3	40.0%	Good	None
SW8260	Toluene	µg/Kg	A	5	8	17	72.0%	Poor	J Flag
SW8081	4,4'-DDE	µg/Kg	A	1.2	NA	0.57	NC		
SW8081	delta-BHC	µg/Kg	A	1.2	0.40	NA	NC		
SW7471	Mercury - Total	mg/Kg	A	0.026	0.025	NA	NC		
SW6010	Aluminum - Total	mg/Kg	A	15.8	4750	5500	14.6%	Good	None
SW6010	Arsenic - Total	mg/Kg	A	3.2	3.9	3.7	5.3%	Good	None
SW6010	Barium - Total	mg/Kg	A	0.79	14.2	15.2	6.8%	Good	None
SW6010	Calcium - Total	mg/Kg	A	31.5	1760	1390	23.5%	Good	None
SW6010	Chromium - Total	mg/Kg	A	0.79	14.1	14.1	0.0%	Good	None
SW6010	Cobalt - Total	mg/Kg	A	0.79	4.8	5.4	11.8%	Good	None
SW6010	Copper - Total	mg/Kg	A	1.6	12.0	13.8	14.0%	Good	None
SW6010	Iron - Total	mg/Kg	A	15.8	9920	11100	11.2%	Good	None
SW6010	Lead - Total	mg/Kg	A	1.6	7.9	7.9	0.0%	Good	None
SW6010	Magnesium - Total	mg/Kg	A	31.5	3320	3650	9.5%	Good	None
SW6010	Manganese - Total	mg/Kg	A	0.32	175	174	0.6%	Good	None
SW6010	Nickel - Total	mg/Kg	A	0.79	8.9	9.5	6.5%	Good	None
SW6010	Potassium - Total	mg/Kg	A	47.3	1590	1870	16.2%	Good	None
SW6010	Sodium - Total	mg/Kg	A	221	3130	3960	23.4%	Good	None

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

Method	Analyte	Unit	Anal Type	PQL	ENV-3	ENV-3D	RPD	RPD Rating	Samp Qual
SW6010	Vanadium - Total	mg/Kg	A	0.79	14.1	16.0	12.6%	Good	None
SW6010	Zinc - Total	mg/Kg	A	3.2	35.8	39.0	8.6%	Good	None
Kahn	Total Organic Carbon	mg/Kg	A	803	5980	9300	43.5%	Good	None

Method	Analyte	Unit	Anal Type	PQL	ENV-3-D4-5	ENV-3D-D4-5	RPD	RPD Rating	Samp Qual
SW9056	Chloride	mg/Kg	A	25.0	4240	4330	2.1%	Good	None
SW9056	Sulfate	mg/Kg	A	20.0	664	607	9.0%	Good	None
SW9045	Leachable pH	S.U.	A	0.0100	8.35	8.21	1.7%	Good	None

Method	Analyte	Unit	Anal Type	PQL	ENV-3-D1-3	ENV-3D-D1-3	RPD	RPD Rating	Samp Qual
SM1613B	1,2,3,4,6,7,8-HpCDD	ng/Kg	A	0.1850	10.6	4.45	81.7%	Poor	J Flag
SM1613B	1,2,3,4,6,7,8-HpCDF	ng/Kg	A	0.0992	1.72	1.38	21.9%	Good	None
SM1613B	1,2,3,4,7,8,9-HpCDF	ng/Kg	A	0.1280	NA	0.169	NC		
SM1613B	1,2,3,4,7,8-HxCDD	ng/Kg	A	0.1030	NA	0.105	NC		
SM1613B	1,2,3,4,7,8-HxCDF	ng/Kg	A	0.0705	0.448	0.421	6.2%	Good	None
SM1613B	1,2,3,6,7,8-HxCDD	ng/Kg	A	0.0973	0.457	0.217	71.2%	Poor	J Flag
SM1613B	1,2,3,6,7,8-HxCDF	ng/Kg	A	0.0684	NA	0.193	NC		
SM1613B	1,2,3,7,8,9-HxCDD	ng/Kg	A	0.0998	0.758	0.286	90.4%	Poor	J Flag
SM1613B	1,2,3,7,8-PeCDD	ng/Kg	A	0.0703	0.104	NA	NC		
SM1613B	1,2,3,7,8-PeCDF	ng/Kg	A	0.0698	0.205	0.159	25.3%	Good	None
SM1613B	2,3,4,6,7,8-HxCDF	ng/Kg	A	0.0795	0.265	0.082	105.5%	Poor	J Flag
SM1613B	2,3,4,7,8-PeCDF	ng/Kg	A	0.0644	0.243	0.227	6.8%	Good	None
SM1613B	2,3,7,8-TCDF	ng/Kg	A	0.1550	0.593	0.639	7.5%	Good	None
SM1613B	OCDD	ng/Kg	A	0.2190	264	95.4	93.8%	Poor	J Flag
SM1613B	OCDF	ng/Kg	A	0.1470	3.27	1.36	82.5%	Poor	J Flag

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-3938
Broadwater Energy	A05-3941
Broadwater Energy	A05-3947
Broadwater Energy	A05-4041

Sediment and surface water, samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Burlington for total organic carbon, and salinity, and Ambient Group, Inc. for coliform. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned

when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 528 reported values in this sample delivery group (SDG), 142 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. Samples analyzed outside holding times are summarized on Table 1.3.

Nitrate and Nitrite, E353.2, soil hold times were evaluated against the water hold time of 2 days. All samples were analyzed within 48 hours of extraction. In some cases, sediment samples may have not been extracted within the 2 day holding time, but this would have minimum on the total nitrate and nitrite results.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of Tetrachloroethene were flagged "U" as non-detected as indicated on Table 2A. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blanks are summarized on in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the

total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except as noted in Tables 4 and 5. Spike samples are not analyzed for general analytical methods because there is no mechanism for which to add the spike.

All the metals results outside control limits were flagged “N” by the laboratory. The “N” flags were converted to “J” flags to indicate an estimated value. If the sample result is greater than 4 times the spike amount, the recovery cannot be accurately measured and there is no impact on the data. There is no impact on data usability for the other positive results associated with spike recoveries outside limits. The recoveries did not indicate any bias in the reporting limits. None of the associated sample results are qualified because none of the results were near the value of the evaluation criteria.

Laboratory Duplicate or Matrix Spike Duplicates

Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable except as noted on Tables 4 and 5. For antimony the spike recoveries for low most likely from spectral interference near the reporting limit, antimony was not detected in the samples. The reporting limit may have a slightly low bias for antimony. Barium and chromium had slightly high recoveries indicating a potential high bias in the results. None of the associated sample results are qualified because none of the results there were no evaluation criteria for these metals in sediments. The associated results were qualified for spike recovery as noted.

Initial Calibration

In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results except for dichlorofluoromethane. No corrective action is required because the compound is not a concern at the site, the result is below the PQL, and the %RSD is not greater than 30% as allowed for a compound typical poor response. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration

In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results except for Dichlorofluoromethane. No corrective action is required because the compound is not a concern at the site, the result is below the PQL, and the %D is not greater than 40% as allowed for a compound typical of poor response. . The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution

Results for several metals (chromium, manganese, iron and calcium) were reported with the "E" flag indicating a serial dilution was high. The results were "J" flagged to indicate an estimate. There is no impact on usability because the metals are not a concern for comparison to criteria.

Field Duplicates

Consistency in both sample collection and sample analysis is checked through analysis of duplicate samples. Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. Table 7 lists the duplicate samples and the original samples they duplicated. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified "J" as estimated.

The water samples collected in duplicate show good precision for all parameters except Non-filterable solids. The results are qualified due to holding time violations that may have let to higher variability as noted above.

Method Issues

The results for chemical oxygen demand (COD) are much greater than the results for biological oxygen demand (BOD). It is clear that the high levels of chloride interfered with the analysis. The results are flagged "J" as estimated and not indicative of actual COD levels.

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/ MSD	ID Corrections
A05-3938	SEDIM	C-8	A5393801	4/19/2005			None
A05-3938	SEDIM	C-8	A5393801MS	4/19/2005	MS/MSD	*	None
A05-3938	SEDIM	C-8	A5393801SD	4/19/2005	MS/MSD	*	None
A05-3938	SEDIM	C-8-D4-5	A5393802	4/19/2005			None
A05-3938	SEDIM	C-8-D4-5	A5393802MS	4/19/2005	MS/MSD	*	None
A05-3938	SEDIM	C-8-D4-5	A5393802SD	4/19/2005	MS/MSD	*	None
A05-3938	SEDIM	C-18	A5393803	4/19/2005			None
A05-3938	SEDIM	C-18-D2.3-3.3	A5393804	4/19/2005			None
A05-3938	SEDIM	C-19	A5393805	4/19/2005			None
A05-3938	SEDIM	C-19-D3.5-4.5	A5393806	4/19/2005			None
A05-3941	SOIL	C-8-D4-5	A5394101	4/19/2005			None
A05-3941	SOIL	C-18-D2.3-3.3	A5394102	4/19/2005			None
A05-3941	SOIL	C-19-D3.5-4.5	A5394103	4/19/2005			None
A05-3941	SOIL	C-8-D4-5 REP	A5394104	4/19/2005			None
A05-3947	WATER	C-19-DS-W	A5394701	4/19/2005			None
A05-3947	WATER	C-19-DM-W	A5394702	4/19/2005			None
A05-3947	WATER	C-19-DB-W	A5394703	4/19/2005			None
A05-3947	WATER	C-19-DB-W	A5394703MS	4/19/2005	MS/MSD		None
A05-4041	WATER	MG-5-DS-W	A5404101	4/21/2005			None
A05-4041	WATER	MG-5-DM-W	A5404102	4/21/2005			None
A05-4041	WATER	MG-5-DM-W	A5404102MS	4/21/2005	MS/MSD		None
A05-4041	WATER	MG-5-DB-W	A5404103	4/21/2005			None
A05-4041	WATER	MG-5D-DS-W	A5404104	4/21/2005			None
A05-4041	WATER	MG-5D-DM-W	A5404105	4/21/2005			None
A05-4041	WATER	MG-5D-DB-W	A5404106	4/21/2005			None
A05-4041	WATER	C-3-DS-W	A5404107	4/22/2005			None
A05-4041	WATER	C-3-DS-W	A5404107MS	4/22/2005	MS/MSD		None
A05-4041	WATER	C-3-DM-W	A5404108	4/22/2005			None
A05-4041	WATER	C-3-DB-W	A5404109	4/22/2005			None
A05-4041	WATER	C-3-DB-W	A5404109MS	4/22/2005	MS/MSD		None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	Samp Type
A05-3938	SEDIM	SW6010	SW6010 Metals Total	3	SAMP
A05-3938	SEDIM	SW7471	SW7471 Mercury Total	3	SAMP

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	Samp Type
A05-3938	SEDIM	SW8260	SW8260 Volatiles	3	SAMP
A05-3938	SEDIM	SW8270	SW8270 SemiVolatiles	3	SAMP
A05-3938	SEDIM	SW9045	SW9045 pH	3	SAMP
A05-3938	SEDIM	SW9056	SW9056 Anions	3	SAMP
A05-3938	SEDIM	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-3941	SOIL	SM2520	SM2520 Salinity	4	SAMP
A05-3947	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-3947	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP
A05-3947	WATER	E160.3	E160.3 Total Residue	3	SAMP
A05-3947	WATER	E160.5	E160.5 Settable Solids	3	SAMP
A05-3947	WATER	E300	E300 Anions	3	SAMP
A05-3947	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-3947	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-3947	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-3947	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-3947	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-3947	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4041	WATER	SMTSS-SS	Colloidal Solids	9	SAMP
A05-4041	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	9	SAMP
A05-4041	WATER	E160.3	E160.3 Total Residue	9	SAMP
A05-4041	WATER	E160.5	E160.5 Settable Solids	9	SAMP
A05-4041	WATER	E300	E300 Anions	9	SAMP
A05-4041	WATER	E350.1	E350.1 Ammonia	9	SAMP
A05-4041	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	9	SAMP
A05-4041	WATER	E353.2	E353.2 Nitrate/Nitrite	9	SAMP
A05-4041	WATER	E365.2	E365.2 Total Phosphorus	9	SAMP
A05-4041	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	9	SAMP
A05-4041	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	9	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
E160.2	C-19-DB-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	C-19-DM-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	C-19-DS-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	C-3-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
									Data
E160.2	C-3-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	C-3-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5D-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5D-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5D-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E160.2	MG-5-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
E353.2	C-18-D2.3-3.3	4/21/2005	Water	SAMP			2	4/23/2005	None
E353.2	C-19-D3.5-4.5	4/21/2005	Water	SAMP			2	4/23/2005	None
E353.2	C-8-D4-5	4/21/2005	Water	MS			2	4/23/2005	None
E353.2	C-8-D4-5	4/21/2005	Water	MSD			2	4/23/2005	None
E353.2	C-8-D4-5	4/21/2005	Water	SAMP			2	4/23/2005	None
SMTSS-SS	C-19-DB-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	C-19-DM-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	C-19-DS-W	4/21/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	C-3-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	C-3-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	C-3-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	MG-5-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	MG-5D-DB-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	MG-5D-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	MG-5D-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SMTSS-SS	MG-5-DM-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
SMTSS-SS	MG-5-DS-W	4/23/2005	Water	SAMP			7	5/5/2005	J Flag All Data
SW8081	C-18	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/20/2005	J Flag All Data
SW8081	C-19	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/20/2005	J Flag All Data
SW8081	C-8	4/21/2005	SEDIM	MS	5	5/17/2005	40	5/20/2005	J Flag All Data
SW8081	C-8	4/21/2005	SEDIM	MSD	5	5/17/2005	40	5/20/2005	J Flag All Data
SW8081	C-8	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/20/2005	J Flag All Data
SW8082	C-18	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/18/2005	J Flag All Data
SW8082	C-19	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/18/2005	J Flag All Data
SW8082	C-8	4/21/2005	SEDIM	MS	5	5/17/2005	40	5/18/2005	J Flag All Data
SW8082	C-8	4/21/2005	SEDIM	MSD	5	5/17/2005	40	5/18/2005	J Flag All Data
SW8082	C-8	4/21/2005	SEDIM	SAMP	5	5/17/2005	40	5/18/2005	J Flag All Data

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

.

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Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0598102	MBLK	Tetrachloroethene	4	J	A	UG/KG	0.8	5
SW8260	A5B0598104	MBLK	Tetrachloroethene	2	J	A	UG/KG	0.8	5

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0598102	SEDIM	Tetrachloroethene	4	2	BJ	5	C-8	U Flag
SW8260	A5B0598104	SEDIM	Tetrachloroethene	2	2	BJ	6	C-18	U Flag
SW8260	A5B0598104	SEDIM	Tetrachloroethene	2	2	BJ	6	C-19	U Flag

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	REPORTABLE
SW6010	C-8	MS	Aluminum - Total	9570	780	46	1	80	120	4X	Yes
SW6010	C-8	MSD	Aluminum - Total	9570	725	145	1	80	120	4X	Yes
SW6010	C-8	MS	Antimony - Total	<0.69	15.6	22	1	80	120	J Flag	Yes
SW6010	C-8	MSD	Antimony - Total	<0.69	14.5	17	1	80	120	J Flag	Yes
SW6010	C-8	MSD	Arsenic - Total	7.1	14.5	74	1	80	120	J Flag	Yes
SW6010	C-8	MSD	Barium - Total	46.4	14.5	160	1	80	120	J Flag	Yes
SW6010	C-8	MSD	Chromium - Total	19.6	14.5	122	1	80	120	J Flag	Yes
SW6010	C-8	MSD	Copper - Total	10.9	14.5	76	1	80	120	J Flag	Yes
SW6010	C-8	MS	Iron - Total	20000	31.2	-889	1	80	120	4X	Yes
SW6010	C-8	MSD	Iron - Total	20000	29	3450	1	80	120	4X	Yes
SW6010	C-8	MS	Magnesium - Total	6140	780	68	1	80	120	4X	Yes

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	REPORTABLE
SW6010	C-8	MS	Manganese - Total	361	15.6	13	1	80	120	4X	Yes
SW6010	C-8	MSD	Manganese - Total	361	14.5	256	1	80	120	4X	Yes
SW6010	C-8	MS	Potassium - Total	3540	780	73	1	80	120	4X	Yes
SW6010	C-8	MSD	Sodium - Total	5090	725	61	1	80	120	4X	Yes
SW6010	C-8	MS	Zinc - Total	43.2	15.6	76	1	80	120	J Flag	Yes

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW6010	C-8	MSD	Aluminum - Total	104	20	J Flag
SW6010	C-8	MSD	Antimony - Total	26	20	J Flag
SW6010	C-8	MSD	Barium - Total	60	20	J Flag
SW6010	C-8	MSD	Calcium - Total	22	20	J Flag
SW6010	C-8	MSD	Chromium - Total	36	20	J Flag
SW6010	C-8	MSD	Iron - Total	339	20	J Flag
SW6010	C-8	MSD	Magnesium - Total	32	20	J Flag
SW6010	C-8	MSD	Manganese - Total	181	20	J Flag
SW6010	C-8	MSD	Sodium - Total	37	20	J Flag
SW6010	C-8	MSD	Zinc - Total	21	20	J Flag
SW9056	C-8-D4-5	MSD	Chloride	23	20	Diluted Out

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Anal Type	PQL	MG-5-DS-W	MG-5D-DS-W	RPD	RPD Rating	Samp Qual
SMTSS-SS	Colloidal Solids	MG/L	A	4.0	4.0	53.0	171.9%	Poor	J Flag
E410.4	Chemical Oxygen Demand	MG/L	A	20.0	673	659	2.1%	Good	None
E300	Chloride	MG/L	A	250	24900	26700	7.0%	Good	None

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Method	Analyte	Unit	Anal Type	PQL	MG-5-DS-W	MG-5D-DS-W	RPD	RPD Rating	Samp Qual
E300	Sulfate	MG/L	A	1000	3360	3340	0.6%	Good	None
E160.3	Total Residue (103 C)	MG/L	A	10	28400	40800	35.8%	Good	None
E160.2	Non-Filterable Residue (103 C)	MG/L	A	10	NA	53.0	NC		

Method	Analyte	Unit	Anal Type	PQL	MG-5-DM-W	MG-5D-DM-W	RPD	RPD Rating	Samp Qual
SMTSS-SS	Colloidal Solids	MG/L	A	4.0	17.0	33.0	64.0%	Poor	J Flag
E410.4	Chemical Oxygen Demand	MG/L	A	20.0	782	777	0.6%	Good	None
E300	Chloride	MG/L	A	250	25200	26500	5.0%	Good	None
E300	Sulfate	MG/L	A	1000	3250	3260	0.3%	Good	None
E160.3	Total Residue (103 C)	MG/L	A	10	30900	33000	6.6%	Good	None
E160.2	Non-Filterable Residue (103 C)	MG/L	A	10	17.0	33.0	64.0%	Poor	J Flag

Method	Analyte	Unit	Anal Type	PQL	MG-5-DB-W	MG-5D-DB-W	RPD	RPD Rating	Samp Qual
SMTSS-SS	Colloidal Solids	MG/L	A	4.0	12.0	17.0	34.5%	Good	None
E410.4	Chemical Oxygen Demand	MG/L	A	20.0	706	843	17.7%	Good	None
E300	Chloride	MG/L	A	250	27300	24600	10.4%	Good	None
E300	Sulfate	MG/L	A	1000	3800	3380	11.7%	Good	None
E160.3	Total Residue (103 C)	MG/L	A	10	28400	36800	25.8%	Good	None
E160.2	Non-Filterable Residue (103 C)	MG/L	A	10	12.0	17.0	34.5%	Good	None

Analyte	Unit	Anal Type	PQL	C-8-D4-5	C-8-D4-5 REP	RPD	RPD Rating	Samp Qual
Salinity	S	A	2.0	ND	3.2	NC		

Key:

A = Analyte

NC = Not Calculated

ND = Not Detected

PQL = Practical Quantitation Limit

RPD = Relative Percent Difference

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-4057
Broadwater Energy	A05-4058
Broadwater Energy	A05-4059

Sediment samples and one rinsate sample were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis STL Knoxville for dioxin, and STL Burlington for total organic carbon, and salinity. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 1024 reported values in this sample delivery group (SDG), 113 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times

Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. Samples analyzed outside holding times are summarized on Table 1.3.

The original SW8270 extraction for sample R-042005 was for base neutral compounds only. The AP spike was omitted. The sample was re-extracted outside of hold times with acceptable QC. The original analysis will be reported and the acid phenol compounds are J flagged. There were no detectable analytes in the rinse blank for SW8270.

Nitrate and Nitrite, E353.2, soil hold times were evaluated against the water hold time of 2 days. All samples were analyzed within 48 hours of extraction. In some cases, sediment samples may have not been extracted within the 2 day holding time, but this would have minimum on the total nitrate and nitrite results.

Method and Calibration Blanks

Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of dioxins, and unknowns were flagged "U" as non-detected as indicated on Table 2A. The other dioxin results slightly above the blank levels were flagged "J" as estimated. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks

Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blank are summarized on Table 2. Several compounds in the rinsate blank were qualified "U" as non-detect based on the method blanks. The only remaining compound detected was carbon disulfide. The same data were qualified consistent with the method blanks. Table 2B shows sample results attributed to field background. There is no impact on data usability because the compound is not a compound of concern and do not have evaluation criteria.

Surrogate Spikes

Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits except for acid phenol surrogates that were not added to one batch. The sample R-042005 was originally prepared for BN only. The AP spike was not added to the original sample, LCS, and method blank. The sample was reanalyzed for the AP compounds and none were detected. The non-detect results are "J " flagged as estimated.

Spike Samples

Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except as noted in Tables 4 and 5. Spike samples are not analyzed for general analytical methods because there is no mechanism for which to add the spike.

All the metals results outside control limits were flagged "N" by the laboratory. The "N" flags were converted to "J" flags to indicate an estimated value. If the sample result is greater than 4 times the spike amount, the recovery cannot be accurately measured and there is no impact on the data. There is no impact on data usability for the other positive results associated with spike recoveries outside limits. The recoveries did not indicate any bias in the reporting limits. None of the associated sample results are qualified because none of the results were near the value of the evaluation criteria.

Laboratory Duplicate or Matrix Spike Duplicates

Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable except as noted on Tables 4 and 5. Several metals had slightly high RPDs. The associated results were qualified for spike recovery as noted.

Initial Calibration

In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results except for dichlorofluoromethane. No corrective action is required because the compound is not a concern at the site, the result is below the PQL, and the %RSD is not greater than 30% as allowed for a compound typical poor response. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration

In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution

Results for analytes reported with the "E" flag during the initial analyses were derived from dilution analyses. The samples were analyzed at a dilution and reported from this analysis as indicated on Table 6.

Field Duplicates

Consistency in both sample collection and sample analysis is checked through analysis of duplicate samples. Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. Table 7 lists the duplicate samples and the original samples they duplicated. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified "J" as estimated.

The sediment samples collected in duplicate show good precision for all parameters except two metals and low level dioxin. Some dioxin results were later qualified "U" as non-detect due to blank contamination.

Tentatively Identified Compounds

The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as "NJ" with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The only significant TICs indicate low level hydrocarbon contaminant in some samples. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL
HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Table 1.1 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MS D MS	ID Corrections
A05-4057	SEDIM	C-20	A5405701	4/21/2005			None
A05-4057	SEDIM	C-20	A5405701MS	4/21/2005	MS/MSD		None
A05-4057	SEDIM	C-20	A5405701SD	4/21/2005	MS/MSD		None
A05-4057	SEDIM	C-20-D4-4.9	A5405702	4/21/2005			None
A05-4057	SEDIM	MG-3	A5405703	4/20/2005			None
A05-4057	SEDIM	MG-3	A5405703MS	4/21/2005	MS/MSD		None
A05-4057	SEDIM	MG-3	A5405703SD	4/21/2005	MS/MSD		None
A05-4057	SEDIM	MG-3-D2.2-2.8	A5405704	4/20/2005			None
A05-4057	SEDIM	MG-5	A5405705	4/21/2005			None
A05-4057	SEDIM	MG-5	A5405705MS	4/21/2005	MS/MSD		None
A05-4057	SEDIM	MG-5	A5405705SD	4/21/2005	MS/MSD		None
A05-4057	SEDIM	MG-5-D3-4	A5405706	4/21/2005			None
A05-4057	WATER	R-042005	A5405707	4/20/2005			None
A05-4057	WATER	R-042005	A5405707RE	4/20/2005			None
A05-4057	WATER	TB-042005	A5405708	4/20/2005			None
A05-4057	SEDIM	C-4	A5405709	4/22/2005			None
A05-4057	SEDIM	C-4-D4-4.8	A5405710	4/22/2005			None
A05-4057	SEDIM	C-4D	A5405711	4/22/2005			None
A05-4057	SEDIM	C-4D-D4-4.8	A5405712	4/22/2005			None
A05-4057	SEDIM	C-2	A5405713	4/22/2005			None
A05-4057	SEDIM	C-2-D4-5	A5405714	4/22/2005			None
A05-4058	SEDIM	C-20	A5405801	4/21/2005			None
A05-4058	SEDIM	C-20-D4-4.9	A5405802	4/21/2005			None
A05-4058	SEDIM	MG-3	A5405803	4/20/2005			None
A05-4058	SEDIM	MG-3-D2.2-2.8	A5405804	4/20/2005			None
A05-4058	SEDIM	C-8	A5405805	4/19/2005			None
A05-4058	SEDIM	C-18	A5405806	4/19/2005			None
A05-4058	SEDIM	C-19	A5405807	4/19/2005			None
A05-4058	SEDIM	MG-5	A5405808	4/21/2005			None
A05-4058	SEDIM	MG-5-D3-4	A5405809	4/21/2005			None
A05-4058	WATER	R-042005	A5405810	4/20/2005			None
A05-4058	SEDIM	C-4	A5405811	4/22/2005			None
A05-4058	SEDIM	C-4-D4-4.8	A5405812	4/22/2005			None
A05-4058	SEDIM	C-4D	A5405813	4/22/2005			None
A05-4058	SEDIM	C-4D-D4-4.8	A5405814	4/22/2005			None

Table 1.1 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MS D MS	ID Corrections
A05-4058	SEDIM	C-2	A5405815	4/22/2005			None
A05-4058	SEDIM	C-2-D4-5	A5405816	4/22/2005			None
A05-4059	SEDIM	C-20-D0-1	A5405901	4/20/2005			None
A05-4059	WATER	R-042005	A5405904	4/20/2005			None
A05-4059	SEDIM	C-4-D2-3	A5405905	4/22/2005			None
A05-4059	SEDIM	C-4D-D2-3	A5405906	4/22/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4057	SEDIM	E353.2	E353.2 Nitrate/Nitrite	6	SAMP
A05-4057	SEDIM	SW6010	SW6010 Metals Total	6	SAMP
A05-4057	SEDIM	SW7471	SW7471 Mercury Total	6	SAMP
A05-4057	SEDIM	SW8081	SW8081 Pesticides	6	SAMP
A05-4057	SEDIM	SW8082	SW8082 PCBs	6	SAMP
A05-4057	SEDIM	SW8260	SW8260 Volatiles	6	SAMP
A05-4057	SEDIM	SW8270	SW8270 SemiVolatiles	6	SAMP
A05-4057	SEDIM	SW9045	SW9045 pH	6	SAMP
A05-4057	SEDIM	SW9056	SW9056 Anions	6	SAMP
A05-4057	WATER	SW6010	SW6010 Metals Total	1	SAMP
A05-4057	WATER	SW7470	SW7470 Mercury Total	1	SAMP
A05-4057	WATER	SW8081	SW80801 Pesticides	1	SAMP
A05-4057	WATER	SW8082	SW8082 PCBs	1	SAMP
A05-4057	WATER	SW8260	SW8260 Volatiles	2	SAMP
A05-4057	WATER	SW8270	SW8270 SemiVolatiles	1	RA
A05-4057	WATER	SW8270	SW8270 SemiVolatiles	1	SAMP
A05-4058	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	9	SAMP
A05-4058	SEDIM	SM2520	SM2520 Salinity	6	SAMP
A05-4058	WATER	SW9060	SW9060 Total Organic Carbon	1	SAMP
A05-4059	SEDIM	SM1613B	SM1613B Dioxins	3	SAMP
A05-4059	WATER	SM1613B	SM1613B Dioxins	1	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
E353.2	C-20-D4-4.9	4/23/2005	SEDIM	SAMP			2	4/26/2005	None
E353.2	C-2-D4-5	4/23/2005	SEDIM	SAMP			2	4/26/2005	None
E353.2	C-4-D4-4.8	4/23/2005	SEDIM	SAMP			2	4/26/2005	None
E353.2	C-4D-D4-4.8	4/23/2005	SEDIM	SAMP			2	4/26/2005	None
E353.2	MG-3-D2.2-2.8	4/23/2005	SEDIM	SAMP			2	4/26/2005	None

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
E353.2	MG-5-D3-4	4/23/2005	SEDIM	SAMP			2	4/26/2005	None
SW8270	R-042005	4/23/2005	WATER	RA	5	5/2/2005	40	5/3/2005	J Flag All Data

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8081	A5B0591302	MBLK	Endrin	0.048	J	A	µg/L	0.012	0.050
SW8081	A5B0591302	MBLK	Endrin ketone	0.026	J	A	µg/L	0.012	0.050
SW8260	A5B0605002	MBLK	BENZENEDICARBOXYLIC ACID DER	41	J	T	µg/Kg		
SW8260	A5B0605004	MBLK	BENZENEDICARBOXYLIC ACID DER	9	J	T	µg/L		
SW8260	TB-042005	SAMP	BENZENEDICARBOXYLIC ACID DER	8	BJ	T	µg/L		
SW8260	TB-042005	SAMP	TRIMETHYLSILANOL	5	JN	T	µg/L		
SW8270	A5B0632503	MBLK	O-HYDROXYBIPHENYL	12	JN	T	µg/L		

Method	Sample ID	Samp Type	Analyte	Result	Qual	VALIDATION	Anal Type	Units	MDL	PQL
SM1613B	R-042005	Rinsate	1,2,3,4,6,7,8-HpCDD	1.01	J	J	A	pg/L	0	49.5000
SM1613B	R-042005	Rinsate	OCDD	7.34	BJ	U	A	pg/L	0	99.0000
SM1613B	R-042005	Rinsate	OCDF	2.48	BJ	U	A	pg/L	0	99.0000
SW8260	R-042005	Rinsate	BENZENEDICARBOXYLIC ACID DER	8	BJ	U	T	µg/L	0	0
SW8260	R-042005	Rinsate	Carbon Disulfide	2.4	J	J	A	µg/L	1.6	5.0

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0605002	SEDIM	BENZENEDICARBOXYLIC ACID DER	41	6	BJ		MG-3	U Flag
SW8260	A5B0605004	WATER	BENZENEDICARBOXYLIC ACID DER	9	8	BJ		TB-042005	U Flag
SW8270	A5B0632503	WATER	O-HYDROXYBIPHENYL	12	11	BJN		R-042005	U Flag

Method	Sample ID	Samp Type	Analyte	Result	Lab Qual	VALIDATION	Units	PQL	SDG
SM1613B	C-4-D2-3	SAMP	1,2,3,4,6,7,8-HpCDF	0.00000071	BJ	U	ppm	0.0000050	BRD3
SM1613B	C-4-D2-3	SAMP	OCDF	0.0000013	BJ	U	ppm	0.000010	BRD3
SM1613B	C-4D-D2-3	SAMP	1,2,3,4,6,7,8-HpCDF	0.00000029	BJ	U	ppm	0.0000050	BRD3
SM1613B	C-4D-D2-3	SAMP	OCDF	0.00000052	BJ	U	ppm	0.000010	BRD3
SM1613B	R-042005	SAMP	OCDD	7.34	BJ	U	pg/L	99.0000	BRD3
SM1613B	R-042005	SAMP	OCDF	2.48	BJ	U	pg/L	99.0000	BRD3

Table 2B - List of Samples Qualified for Field Blank Contamination

Method	Lab Blank	Matrix	Affected Samples	Analyte	Sample Result	Lab Qual	VALIDATION
SW8260	A5375501	SEDIM	ENV-5	Carbon Disulfide	2	J	U
SW8260	A5375503	SEDIM	ENV-4	Carbon Disulfide	4	J	U
SW8260	A5375505	SEDIM	ENV-3	Carbon Disulfide	5	J	U
SW8260	A5375507	SEDIM	ENV-3D	Carbon Disulfide	4	J	U
SW8260	A5375509	SEDIM	ENV-2	Carbon Disulfide	7		U
SW8260	A5375511	SEDIM	C-9	Carbon Disulfide	4	J	U
SW8260	A5393801	SEDIM	C-8	Carbon Disulfide	5	J	U
SW8260	A5405709	SEDIM	C-4	Carbon Disulfide	5	J	U
SW8260	A5405711	SEDIM	C-4D	Carbon Disulfide	6		U
SW8260	A5405713	SEDIM	C-2	Carbon Disulfide	5	J	U
SW8260	A5410601	SEDIM	C-17	Carbon Disulfide	5	J	U
SW8260	A5422403	SEDIM	C-16D	Carbon Disulfide	5	J	U
SW8260	A5422405	SEDIM	C-15	Carbon Disulfide	4	J	U
SW8260	A5429101	SEDIM	IC-7	Carbon Disulfide	6		U
SW8260	A5429103	SEDIM	IC-6	Carbon Disulfide	4	J	U
SW8260	A5434801	SEDIM	C-3	Carbon Disulfide	5	J	U
SW8260	A5434803	SEDIM	C-3D	Carbon Disulfide	5	J	U
SW8260	A5434805	SEDIM	C-1	Carbon Disulfide	5		U
SW8260	A5439006	SEDIM	IC-14	Carbon Disulfide	5	J	U
SW8260	A5439012	SEDIM	C-22	Carbon Disulfide	5	J	U
SW8260	A5454101	SEDIM	C-26	Carbon Disulfide	5	J	U
SW8260	A5454103	SEDIM	C-24	Carbon Disulfide	5	J	U
SW8260	A5454105	SEDIM	C-23	Carbon Disulfide	5	J	U
SW8260	A5454107	SEDIM	C-25	Carbon Disulfide	5	J	U
SW8260	A5454109	SEDIM	C-28	Carbon Disulfide	5	J	U
SW8260	A5454111	SEDIM	C-27	Carbon Disulfide	5	J	U

Table 3 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac	Sample Qual.
SW8270	A5B0592901	LCS	2,4,6-Tribromophenol	0	62	133	1	None
SW8270	A5B0592901	LCS	2-Fluorophenol	0	21	120	1	None
SW8270	A5B0592901	LCS	Phenol-D5	0	13	120	1	None
SW8270	A5B0592902	MBLK	2,4,6-Tribromophenol	0	62	133	1	None
SW8270	A5B0592902	MBLK	2-Fluorophenol	0	21	120	1	None
SW8270	A5B0592902	MBLK	Phenol-D5	0	13	120	1	None
SW8270	A5B0592903	LCSD	2,4,6-Tribromophenol	0	62	133	1	None
SW8270	A5B0592903	LCSD	2-Fluorophenol	0	21	120	1	None
SW8270	A5B0592903	LCSD	Phenol-D5	0	13	120	1	None
SW8270	R-042005	SAMP	2,4,6-Tribromophenol	0	62	133	1	None
SW8270	R-042005	SAMP	2-Fluorophenol	0	21	120	1	None
SW8270	R-042005	SAMP	Phenol-D5	0	13	120	1	None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	Reportable
SW6010	C-20	MS	Aluminum - Total	2940	565	4	1	80	120	4X	Yes
SW6010	C-20	MSD	Aluminum - Total	2940	596	7	1	80	120	4X	Yes
SW6010	C-20	MS	Antimony - Total	<0.69	11.3	38	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Antimony - Total	<0.69	11.9	39	1	80	120	J Flag	Yes
SW6010	C-20	MS	Arsenic - Total	2.3	11.3	72	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Arsenic - Total	2.3	11.9	72	1	80	120	J Flag	Yes
SW6010	C-20	MS	Barium - Total	8.0	11.3	70	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Barium - Total	8.0	11.9	72	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Beryllium - Total	0.17	11.9	79	1	80	120	J Flag	Yes
SW6010	C-20	MS	Calcium - Total	783	565	66	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Calcium - Total	783	596	65	1	80	120	J Flag	Yes
SW6010	C-20	MS	Chromium - Total	8.4	11.3	67	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Chromium - Total	8.4	11.9	68	1	80	120	J Flag	Yes
SW6010	C-20	MS	Cobalt - Total	2.9	11.3	75	1	80	120	J Flag	Yes

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Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	Reportable
SW6010	C-20	MSD	Cobalt - Total	2.9	11.9	73	1	80	120	J Flag	Yes
SW6010	C-20	MS	Copper - Total	7.8	11.3	72	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Copper - Total	7.8	11.9	72	1	80	120	J Flag	Yes
SW6010	C-20	MS	Iron - Total	7100	565	-137	1	80	120	4X	Yes
SW6010	C-20	MSD	Iron - Total	7100	596	-139	1	80	120	4X	Yes
SW6010	C-20	MS	Lead - Total	4.2	11.3	77	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Lead - Total	4.2	11.9	78	1	80	120	J Flag	Yes
SW6010	C-20	MS	Magnesium - Total	1760	565	37	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Magnesium - Total	1760	596	35	1	80	120	J Flag	Yes
SW6010	C-20	MS	Manganese - Total	78.7	11.3	-46	1	80	120	4X	Yes
SW6010	C-20	MSD	Manganese - Total	78.7	11.9	-74	1	80	120	4X	Yes
SW6010	C-20	MS	Nickel - Total	5.5	11.3	69	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Nickel - Total	5.5	11.9	69	1	80	120	J Flag	Yes
SW6010	C-20	MS	Potassium - Total	940	565	63	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Potassium - Total	940	596	63	1	80	120	J Flag	Yes
SW6010	C-20	MS	Selenium - Total	<0.48	11.3	74	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Selenium - Total	<0.48	11.9	74	1	80	120	J Flag	Yes
SW6010	C-20	MS	Silver - Total	<0.15	2.8	79	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Silver - Total	<0.15	3	76	1	80	120	J Flag	Yes
SW6010	C-20	MS	Sodium - Total	2110	565	41	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Sodium - Total	2110	596	27	1	80	120	J Flag	Yes
SW6010	C-20	MS	Thallium - Total	<0.31	11.3	78	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Thallium - Total	<0.31	11.9	76	1	80	120	J Flag	Yes
SW6010	C-20	MS	Vanadium - Total	9.2	11.3	69	1	80	120	J Flag	Yes
SW6010	C-20	MSD	Vanadium - Total	9.2	11.9	70	1	80	120	J Flag	Yes
SW6010	C-20	MS	Zinc - Total	20.3	11.3	55	1	80	120	J Flag	Yes

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Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	Reportable
SW6010	C-20	MSD	Zinc - Total	20.3	11.9	55	1	80	120	J Flag	Yes

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW6010	C-20	MSD	Aluminum - Total	54	20	None
SW6010	C-20	MSD	Manganese - Total	47	20	None
SW6010	C-20	MSD	Sodium - Total	41	20	None

Table 5 - List LCS Recoveries outside Control Limits

Method	Sample ID	Analyte	Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
SW8270	A5B0592901	2,4,5-Trichlorophenol	0	52	139	1	J Flag
SW8270	A5B0592901	2,4,6-Tribromophenol	0	62	133	1	J Flag
SW8270	A5B0592901	2,4,6-Trichlorophenol	0	48	139	1	J Flag
SW8270	A5B0592901	2,4-Dichlorophenol	0	36	126	1	J Flag
SW8270	A5B0592901	2,4-Dimethylphenol	4	35	125	1	J Flag
SW8270	A5B0592901	2,4-Dinitrophenol	0	15	155	1	J Flag
SW8270	A5B0592901	2-Chlorophenol	0	33	120	1	J Flag
SW8270	A5B0592901	2-Fluorophenol	0	21	120	1	J Flag
SW8270	A5B0592901	2-Methylphenol	0	26	134	1	J Flag
SW8270	A5B0592901	2-Nitrophenol	6	41	120	1	J Flag
SW8270	A5B0592901	4,6-Dinitro-2-methylphenol	0	39	164	1	J Flag
SW8270	A5B0592901	4-Chloro-3-methylphenol	0	48	135	1	J Flag
SW8270	A5B0592901	4-Methylphenol	0	35	125	1	J Flag
SW8270	A5B0592901	Pentachlorophenol	0	21	137	1	J Flag
SW8270	A5B0592901	Phenol	6	13	149	1	J Flag
SW8270	A5B0592901	Phenol-D5	0	13	120	1	J Flag
SW8270	A5B0592903	2,4,5-Trichlorophenol	0	52	139	1	J Flag

Method	Sample ID	Analyte	Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
SW8270	A5B0592903	2,4,6-Tribromophenol	0	62	133	1	J Flag
SW8270	A5B0592903	2,4,6-Trichlorophenol	0	48	139	1	J Flag
SW8270	A5B0592903	2,4-Dichlorophenol	0	36	126	1	J Flag
SW8270	A5B0592903	2,4-Dimethylphenol	2	35	125	1	J Flag
SW8270	A5B0592903	2,4-Dinitrophenol	0	15	155	1	J Flag
SW8270	A5B0592903	2-Chlorophenol	0	33	120	1	J Flag
SW8270	A5B0592903	2-Fluorophenol	0	21	120	1	J Flag
SW8270	A5B0592903	2-Methylphenol	0	26	134	1	J Flag
SW8270	A5B0592903	2-Nitrophenol	6	41	120	1	J Flag
SW8270	A5B0592903	4,6-Dinitro-2-methylphenol	0	39	164	1	J Flag
SW8270	A5B0592903	4-Chloro-3-methylphenol	0	48	135	1	J Flag
SW8270	A5B0592903	4-Methylphenol	0	35	125	1	J Flag
SW8270	A5B0592903	Dimethyl phthalate	46	50	135	1	J Flag
SW8270	A5B0592903	Pentachlorophenol	0	21	137	1	J Flag
SW8270	A5B0592903	Phenol	6	13	149	1	J Flag
SW8270	A5B0592903	Phenol-D5	0	13	120	1	J Flag

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW8270	A5B0592903	LCSD	2,4-Dimethylphenol	67	42	None
SW8270	A5B0592903	LCSD	2-Methylphenol	200	27	None
SW8270	A5B0592903	LCSD	4-Methylphenol	200	24	None
SW8270	A5B0592903	LCSD	Dimethyl phthalate	25	15	None

Table 6 –Samples that were Reanalyzed

Sample ID	Lab ID	Method	Sample Type	Action
R-042005	A5405707	SW8270	SAMP	Report, add UJ flags
R-042005	A5405707RE	SW8270	RA	Do Not Report

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Anal Type	PQL	C-4	C-4D	RPD	RPD Rating	Samp Qual
SW8260	Carbon Disulfide	µg/Kg	A	5	3	6	66.7%	Good	None
SW8260	Toluene	µg/Kg	A	5	27	1	185.7%	Poor	J Flag
SW7471	Mercury - Total	mg/Kg	A	0.018	0.040	0.021	62.3%	Good	None
SW6010	Aluminum - Total	mg/Kg	A	9.3	7900	6960	12.7%	Good	None
SW6010	Arsenic - Total	mg/Kg	A	1.9	5.0	5.2	3.9%	Good	None
SW6010	Barium - Total	mg/Kg	A	0.47	23.6	21.4	9.8%	Good	None
SW6010	Beryllium - Total	mg/Kg	A	0.19	0.40	0.36	10.5%	Good	None
SW6010	Calcium - Total	mg/Kg	A	18.7	2950	2570	13.8%	Good	None
SW6010	Chromium - Total	mg/Kg	A	0.47	26.5	15.4	53.0%	Good	None
SW6010	Cobalt - Total	mg/Kg	A	0.47	7.0	6.4	9.0%	Good	None
SW6010	Copper - Total	mg/Kg	A	0.93	28.8	9.0	104.8%	Poor	J Flag
SW6010	Iron - Total	mg/Kg	A	9.3	15300	13800	10.3%	Good	None
SW6010	Lead - Total	mg/Kg	A	0.93	18.6	6.2	100.0%	Poor	J Flag
SW6010	Magnesium - Total	mg/Kg	A	18.7	5490	5200	5.4%	Good	None
SW6010	Manganese - Total	mg/Kg	A	0.19	419	312	29.3%	Good	None
SW6010	Nickel - Total	mg/Kg	A	0.47	13.4	11.4	16.1%	Good	None
SW6010	Potassium - Total	mg/Kg	A	28.0	2580	2240	14.1%	Good	None
SW6010	Sodium - Total	mg/Kg	A	131	5710	4690	19.6%	Good	None
SW6010	Vanadium - Total	mg/Kg	A	0.47	21.6	18.5	15.5%	Good	None
SW6010	Zinc - Total	mg/Kg	A	1.9	70.7	34.5	68.8%	Good	None
E415.1 Kahn	Total Organic Carbon	mg/Kg	A	776	6940	8640	21.8%	Good	None

Method	Analyte	Unit	Anal Type	PQL	C-4-D4-4_8	C-4D-D4-4_8	RPD	RPD Rating	Samp Qual
SW9056	Chloride	mg/Kg	A	50.0	4890	2720	57.0%	Good	None
SW9056	Sulfate	mg/Kg	A	200	726	364	66.4%	Good	None
SW9045	Leachable pH	S.U.	A	0.0100	8.33	8.40	0.8%	Good	None
SM2520	Salinity	S	A	2.0	4.2	3.8	10.0%	Good	None
E353.2	Leachable Nitrate	mg/Kg	A	1.0	1.5	2.6	53.7%	Good	None
E353.2	Leachable Nitrite	mg/Kg	A	1.0	4.0	3.3	19.2%	Good	None

Method	Analyte	Unit	Anal Type	PQL	C-4-D2-3	C-4D-D2-3	RPD	RPD Rating	Samp Qual
SM1613B	1,2,3,4,6,7,8-HpCDD	ng/Kg	A	5.0000	8.43	2.70	103.0%	Poor	J Flag
SM1613B	1,2,3,4,6,7,8-HpCDF	ng/Kg	A	5.0000	0.708	0.290	83.8%	Poor	J Flag
SM1613B	1,2,3,4,7,8-HxCDD	ng/Kg	A	5.0000	0.244	NA	NC		
SM1613B	1,2,3,7,8,9-HxCDD	ng/Kg	A	5.0000	0.719	NA	NC		
SM1613B	1,2,3,7,8-PeCDD	ng/Kg	A	5.0000	0.242	NA	NC		
SM1613B	2,3,4,6,7,8-HxCDF	ng/Kg	A	5.0000	0.105	NA	NC		
SM1613B	OCDD	ng/Kg	A	10.0000	206	64.6	104.5%	Poor	U Flag
SM1613B	OCDF	ng/Kg	A	10.0000	1.32	0.521	86.8%	Poor	U Flag

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference
T = Tentatively Identified Compound

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Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-4106
Broadwater Energy	A05-4109
Broadwater Energy	A05-4224
Broadwater Energy	A05-4227
Broadwater Energy	A05-4267

Sediment and surface water, samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Burlington total organic carbon, and salinity, and Ambient Group, Inc. for coliform. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL the PQL is considered elevated.

Out of a total of 540 reported values in this sample delivery group (SDG), 31 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. All samples were analyzed within holding times.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of Endrin were detected in the method blank. There were no samples with Endrin detected associated with this blank.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blanks are summarized on in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix

effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except as noted in Table 4 for chemical oxygen demand (COD). COD results are already considered estimated based on method interference described below.

Laboratory Duplicate or Matrix Spike Duplicates
Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable.

Initial Calibration
In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified

Continuing Calibration
In a number of cases, where the percent difference for a chemical was found to have exceeded the specified limit of 25%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution
Results for several metals (aluminum, potassium, calcium, manganese, iron and magnesium) were reported with the "E" flag indicating a serial dilution was high. The results were "J" flagged to indicate an estimate. There is no impact on usability because the metals are not a concern for comparison to criteria.

Field Duplicates
Consistency in both sample collection and sample analysis is checked through analysis of duplicate samples. Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. Table 1 lists the duplicate samples and the original samples they duplicated. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified "J" as estimated. All field duplicates exhibited acceptable precision.

Method Issues
The results for COD are much greater than the results for biological oxygen demand (BOD). It is clear that the high levels of chloride interfered with the analysis. The results are flagged "J" as estimated and not indicative of actual COD levels.

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

WorkOrder	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD MS	ID Corrections
A05-4106	SEDIM	C-17	A5410601	4/24/2005			None
A05-4106	SEDIM	C-17-D4-4.3	A5410602	4/24/2005			None
A05-4109	SEDIM	C-17	A5410901	4/24/2005			None
A05-4109	SEDIM	C-17-D4-4.3	A5410902	4/24/2005			None
A05-4224	SEDIM	C-16	A5422401	4/26/2005			None
A05-4224	SEDIM	C-16-D4-5	A5422402	4/26/2005			None
A05-4224	SEDIM	C-16D	A5422403	4/26/2005			None
A05-4224	SEDIM	C-16D-D4-5	A5422404	4/26/2005			None
A05-4224	SEDIM	C-16D-D4-5	A5422404MS	4/26/2005	MS/MSD		None
A05-4224	SEDIM	C-15	A5422405	4/26/2005			None
A05-4224	SEDIM	C-15-D4-5	A5422406	4/26/2005			None
A05-4224	WATER	C-15-DS-W	A5422407	4/26/2005			None
A05-4224	WATER	C-15-DM-W	A5422408	4/26/2005			None
A05-4224	WATER	C-15-DB-W	A5422409	4/26/2005			None
A05-4224	WATER	C-15-DB-W	A5422409MS	4/26/2005	MS/MSD		None
A05-4227	SEDIM	C-16	A5422701	4/26/2005			None
A05-4227	SEDIM	C-16-D4-5	A5422702	4/26/2005			None
A05-4227	SEDIM	C-16D	A5422703	4/26/2005			None
A05-4227	SEDIM	C-16D-D4-5	A5422704	4/26/2005			None
A05-4227	SEDIM	C-15	A5422705	4/26/2005			None
A05-4227	SEDIM	C-15-D4-5	A5422706	4/26/2005			None
A05-4267	WATER	IC-6-DS-W	A5426701	4/27/2005			None
A05-4267	WATER	IC-6-DM-W	A5426702	4/27/2005			None
A05-4267	WATER	IC-6-DM-W	A5426702MS	4/27/2005	MS/MSD		None
A05-4267	WATER	IC-6-DB-W	A5426703	4/27/2005			None
A05-4267	WATER	IC-6-DB-W	A5426703MS	4/27/2005	MS/MSD		None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4106	SEDIM	SW6010	SW6010 Metals Total	1	SAMP
A05-4106	SEDIM	SW7471	SW7471 Mercury Total	1	SAMP
A05-4106	SEDIM	SW8081	SW8081 Pesticides	1	SAMP
A05-4106	SEDIM	SW8082	SW8082 PCBs	1	SAMP
A05-4106	SEDIM	SW8260	SW8260 Volatiles	1	SAMP
A05-4106	SEDIM	SW8270	SW8270 SemiVolatiles	1	SAMP
A05-4106	SEDIM	SW9045	SW9045 pH	1	SAMP
A05-4106	SEDIM	SW9056	SW9056 Anions	1	SAMP

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4106	SEDIM	E353.2	E353.2 Nitrate/Nitrite	1	SAMP
A05-4109	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	1	SAMP
A05-4109	SEDIM	SM2520	SM2520 Salinity	1	SAMP
A05-4224	SEDIM	SW6010	SW6010 Metals Total	3	SAMP
A05-4224	SEDIM	SW7471	SW7471 Mercury Total	3	SAMP
A05-4224	SEDIM	SW8081	SW8081 Pesticides	3	SAMP
A05-4224	SEDIM	SW8082	SW8082 PCBs	3	SAMP
A05-4224	SEDIM	SW8260	SW8260 Volatiles	3	SAMP
A05-4224	SEDIM	SW8270	SW8270 SemiVolatiles	3	SAMP
A05-4224	SEDIM	SW9045	SW9045 pH	3	SAMP
A05-4224	SEDIM	SW9056	SW9056 Anions	3	SAMP
A05-4224	SEDIM	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4224	WATER	E160.5	E160.5 Settable Solids	3	SAMP
A05-4224	WATER	E300	E300 Anions	3	SAMP
A05-4224	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-4224	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4224	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4224	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-4224	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-4224	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-4224	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-4224	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP
A05-4227	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	3	SAMP
A05-4227	SEDIM	SM2520	SM2520 Salinity	3	SAMP
A05-4267	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-4267	WATER	E160.5	E160.5 Settable Solids	3	SAMP
A05-4267	WATER	E300	E300 Anions	3	SAMP
A05-4267	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-4267	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4267	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4267	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-4267	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-4267	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-4267	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP

Table 1.3 Holding Time Exceptions

None

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8081	A5B0601403	MBLK	Endrin	1.2	J	A	µg/Kg	0.19	1.6

Table 2A - List of Samples Qualified for Method Blank Contamination
None

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	REPORTABLE
E410.4	IC-6-DB-W	MS	Chemical Oxygen Demand	1830	800	111	1	90	110	None	Yes

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Anal Type	PQL	C-16	C-16D	RPD	RPD Rating	Samp Qual
SW8260	Carbon Disulfide	µg/Kg	A	5	NA	2	NC		
SW8260	Toluene	µg/Kg	A	5	3	6	66.7%	Good	None
SW7471	Mercury - Total	mg/Kg	A	0.017	0.020	NA	NC		
SW6010	Aluminum - Total	mg/Kg	A	7.7	6810	8360	20.4%	Good	None
SW6010	Arsenic - Total	mg/Kg	A	1.5	5.9	7.6	25.2%	Good	None
SW6010	Barium - Total	mg/Kg	A	0.38	18.8	23.2	21.0%	Good	None
SW6010	Beryllium - Total	mg/Kg	A	0.15	0.33	0.42	24.0%	Good	None

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Method	Analyte	Unit	Anal Type	PQL	C-16	C-16D	RPD	RPD Rating	Samp Qual
SW6010	Calcium - Total	mg/Kg	A	15.3	2580	2650	2.7%	Good	None
SW6010	Chromium - Total	mg/Kg	A	0.38	14.5	18.3	23.2%	Good	None
SW6010	Cobalt - Total	mg/Kg	A	0.38	5.9	6.7	12.7%	Good	None
SW6010	Copper - Total	mg/Kg	A	0.77	6.2	11.7	61.5%	Good	None
SW6010	Iron - Total	mg/Kg	A	7.7	13900	16300	15.9%	Good	None
SW6010	Lead - Total	mg/Kg	A	0.77	4.6	7.4	46.7%	Good	None
SW6010	Magnesium - Total	mg/Kg	A	15.3	4900	5560	12.6%	Good	None
SW6010	Manganese - Total	mg/Kg	A	0.15	244	249	2.0%	Good	None
SW6010	Nickel - Total	mg/Kg	A	0.38	11.1	13.6	20.2%	Good	None
SW6010	Potassium - Total	mg/Kg	A	23.0	2220	2700	19.5%	Good	None
SW6010	Sodium - Total	mg/Kg	A	107	4550	6010	27.7%	Good	None
SW6010	Vanadium - Total	mg/Kg	A	0.38	18.4	23.1	22.7%	Good	None
SW6010	Zinc - Total	mg/Kg	A	1.5	28.9	42.5	38.1%	Good	None
E415.1 Kahn	Total Organic Carbon	mg/Kg	A	809	9510	9910	4.1%	Good	None

Method	Analyte	Unit	Anal Type	PQL	C-16-D4-5	C-16D-D4-5	RPD	RPD Rating	Samp Qual
SW9056	Chloride	mg/Kg	A	25.0	5450	6220	13.2%	Good	None
SW9056	Sulfate	mg/Kg	A	100	604	867	35.8%	Good	None
SW9045	Leachable pH	S.U.	A	0.0100	8.19	8.09	1.2%	Good	None
SM2520	Salinity	S	A	2.0	5.2	4.6	12.2%	Good	None

Key:
- A = Analyte
- NC = Not Calculated
- ND = Not Detected
- PQL = Practical Quantitation Limit
- RPD = Relative Percent Difference
- T = Tentatively Identified Compound

Reference:

ProjectID	Lab Work Order
Broadwater Energy	A05-4291
Broadwater Energy	A05-4292
Broadwater Energy	A05-4293

Sediment samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Knoxville for dioxin and STL Burlington for total organic carbon, and salinity. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 270 reported values in this sample delivery group (SDG), 39 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. Samples analyzed outside holding times are summarized on Table 1.3. No qualification for samples analyzed within method holding times as indicated on the table.

One sample was re-analyzed for volatiles because of ethylbenzene calibration. The reanalysis is reported and the sample result was flagged "J" as estimated.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of dioxins, unknowns and acetone were flagged "U" as non-detected as indicated on Table 2A. The other dioxin results slightly above the blank levels were flagged "J" as estimated. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blanks are summarized on in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a

concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except as noted in Tables 4 and 5. Spike samples are not analyzed for general analytical methods because there is no mechanism for which to add the spike.

All the metals results outside control limits were flagged “N” by the laboratory. The “N” flags were converted to “J” flags to indicate an estimated value. If the sample result is greater than 4 times the spike amount, the recovery cannot be accurately measured and there is no impact on the data. There is no impact on data usability for the other positive results associated with spike recoveries outside limits. The recoveries did not indicate any bias in the reporting limits. None of the associated sample results are qualified because none of the results were near the value of the evaluation criteria.

Laboratory Duplicate or Matrix Spike Duplicates

Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable except as noted on Tables 4 and 5. The associated results were qualified for spike recovery as noted.

Initial Calibration

In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration

In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution/Reanalysis

Samples for VOC analysis were analyzed as indicated on Table 6. Samples were processed within outside holding times and flagged as estimated.

Tentatively Identified Compounds

The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as “NJ” with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The only significant TICs indicate low level hydrocarbon contaminant in some samples including IC-6. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL

HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

WorkOrder	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD MS	ID Corrections
A05-4291	SEDIM	IC-7	A5429101	4/27/2005			None
A05-4291	SEDIM	IC-7	A5429101MS	4/27/2005	MS/MSD	*	None
A05-4291	SEDIM	IC-7	A5429101SD	4/27/2005	MS/MSD	*	None
A05-4291	SEDIM	IC-7-D4-5	A5429102	4/27/2005			None
A05-4291	SEDIM	IC-7-D4-5	A5429102MS	4/27/2005	MS/MSD	*	None
A05-4291	SEDIM	IC-7-D4-5	A5429102SD	4/27/2005	MS/MSD	*	None
A05-4291	SEDIM	IC-6	A5429103	4/27/2005			None
A05-4291	SEDIM	IC-6	A5429103RI	4/27/2005			None
A05-4291	SEDIM	IC-6-D4-5	A5429104	4/27/2005			None
A05-4292	SEDIM	IC-7-D2-3	A5429201	4/27/2005			None
A05-4293	SEDIM	IC-7	A5429301	4/27/2005			None
A05-4293	SEDIM	IC-7-D4-5	A5429302	4/27/2005			None
A05-4293	SEDIM	IC-6	A5429303	4/27/2005			None
A05-4293	SEDIM	IC-6-D4-5	A5429304	4/27/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4291	SEDIM	E353.2	E353.2 Nitrate/Nitrite	2	SAMP
A05-4291	SEDIM	SW6010	SW6010 Metals Total	2	SAMP
A05-4291	SEDIM	SW7471	SW7471 Mercury Total	2	SAMP
A05-4291	SEDIM	SW8081	SW8081 Pesticides	2	SAMP
A05-4291	SEDIM	SW8082	SW8082 PCBs	2	SAMP
A05-4291	SEDIM	SW8260	SW8260 Volatiles	1	RE
A05-4291	SEDIM	SW8260	SW8260 Volatiles	2	SAMP
A05-4291	SEDIM	SW8270	SW8270 SemiVolatiles	2	SAMP
A05-4291	SEDIM	SW9045	SW9045 pH	2	SAMP
A05-4291	SEDIM	SW9056	SW9056 Anions	2	SAMP
A05-4292	SEDIM	SM1613B	SM1613B Dioxins	1	SAMP
A05-4293	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	2	SAMP
A05-4293	SEDIM	SM2520	SM2520 Salinity	2	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
SW8260	IC-6	4/29/2005	SEDIM	RE			5	5/13/2005	J Flag All Data
SW8260	IC-7	4/26/2005	SEDIM	SAMP			5	5/4/2005	Within Method

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0647302	MBLK	1,1-DIFLUOROETHANE	17	JN	T	µg/Kg		
SW8260	A5B0647302	MBLK	Acetone	30		A	µg/Kg	22	25
SW8260	A5B0647302	MBLK	Chloromethane	1	J	A	µg/Kg	0.7	5
SW8260	A5B0720802	MBLK	OCTAMETHYLCYCLOTETRASILOXANE	6	JN	T	µg/Kg		

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0647302	SEDIM	Acetone	30	19	BJ	21	IC-6	U Flag

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-4292	SM1613B	IC-7-D2-3	1,2,3,4,6,7,8-HpCDF	0.0000012	BJ	J
A05-4292	SM1613B	IC-7-D2-3	OCDD	0.00041	B	J
A05-4292	SM1613B	IC-7-D2-3	OCDF	0.0000030	BJ	U

Table 2B - List of Samples Qualified for Field Blank Contamination

None

Table 3 - List of Samples with Surrogates outside Control Limits

None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.
SW9056	IC-7-D4-5	MSD	Sulfate	963	711	142	5	75	125	Diluted Out
SW8260	IC-7	MSD	Benzene	<0.8	48.3	66	1	74	128	J Flag
SW8260	IC-7	MS	Chlorobenzene	<0.6	48.4	75	1	76	124	J Flag
SW8260	IC-7	MSD	Chlorobenzene	<0.6	48.3	60	1	76	124	J Flag
SW8260	IC-7	MSD	Trichloroethene	<0.6	48.3	66	1	74	127	J Flag
SW6010	IC-7	MS	Aluminum - Total	5820	812	16	1	80	120	4X
SW6010	IC-7	MSD	Aluminum - Total	5820	860	140	1	80	120	4X
SW6010	IC-7	MS	Antimony - Total	<0.69	16.3	22	1	80	120	J Flag
SW6010	IC-7	MSD	Antimony - Total	<0.69	17.2	43	1	80	120	J Flag

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Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.
SW6010	IC-7	MS	Arsenic - Total	3.7	16.3	61	1	80	120	J Flag
SW6010	IC-7	MSD	Arsenic - Total	3.7	17.2	74	1	80	120	J Flag
SW6010	IC-7	MS	Barium - Total	29.6	16.3	66	1	80	120	J Flag
SW6010	IC-7	MS	Beryllium - Total	0.29	16.3	67	1	80	120	J Flag
SW6010	IC-7	MSD	Beryllium - Total	0.29	17.2	79	1	80	120	J Flag
SW6010	IC-7	MS	Cadmium - Total	<0.060	16.3	63	1	80	120	J Flag
SW6010	IC-7	MSD	Cadmium - Total	<0.060	17.2	76	1	80	120	J Flag
SW6010	IC-7	MS	Calcium - Total	6230	812	-162	1	80	120	4X
SW6010	IC-7	MSD	Calcium - Total	6230	860	-256	1	80	120	4X
SW6010	IC-7	MS	Chromium - Total	11.6	16.3	58	1	80	120	J Flag
SW6010	IC-7	MS	Cobalt - Total	5.9	16.3	62	1	80	120	J Flag
SW6010	IC-7	MSD	Cobalt - Total	5.9	17.2	78	1	80	120	J Flag
SW6010	IC-7	MS	Copper - Total	10.3	16.3	41	1	80	120	J Flag
SW6010	IC-7	MSD	Copper - Total	10.3	17.2	65	1	80	120	J Flag
SW6010	IC-7	MS	Iron - Total	11800	812	-52	1	80	120	4X
SW6010	IC-7	MSD	Iron - Total	11800	860	186	1	80	120	4X
SW6010	IC-7	MS	Lead - Total	4.6	16.3	63	1	80	120	J Flag
SW6010	IC-7	MS	Magnesium - Total	4100	812	28	1	80	120	4X
SW6010	IC-7	MS	Manganese - Total	377	16.3	-111	1	80	120	4X
SW6010	IC-7	MSD	Manganese - Total	377	17.2	15	1	80	120	4X
SW6010	IC-7	MS	Nickel - Total	10.4	16.3	60	1	80	120	J Flag
SW6010	IC-7	MS	Potassium - Total	1650	812	54	1	80	120	J Flag
SW6010	IC-7	MS	Selenium - Total	<0.48	16.3	64	1	80	120	J Flag
SW6010	IC-7	MSD	Selenium - Total	<0.48	17.2	77	1	80	120	J Flag
SW6010	IC-7	MS	Silver - Total	<0.15	4.1	72	1	80	120	J Flag
SW6010	IC-7	MS	Sodium - Total	4330	812	28	1	80	120	4X
SW6010	IC-7	MSD	Sodium - Total	4330	860	132	1	80	120	4X
SW6010	IC-7	MS	Thallium - Total	<0.31	16.3	68	1	80	120	J Flag
SW6010	IC-7	MS	Vanadium - Total	16.6	16.3	57	1	80	120	J Flag
SW6010	IC-7	MS	Zinc - Total	28.0	16.3	47	1	80	120	J Flag

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW6010	IC-7	MSD	Aluminum - Total	159	20	None
SW6010	IC-7	MSD	Antimony - Total	65	20	None
SW6010	IC-7	MSD	Barium - Total	23	20	None
SW6010	IC-7	MSD	Calcium - Total	45	20	None
SW6010	IC-7	MSD	Chromium - Total	39	20	None
SW6010	IC-7	MSD	Cobalt - Total	23	20	None
SW6010	IC-7	MSD	Copper - Total	45	20	None
SW6010	IC-7	MSD	Iron - Total	355	20	None
SW6010	IC-7	MSD	Lead - Total	30	20	None
SW6010	IC-7	MSD	Magnesium - Total	122	20	None
SW6010	IC-7	MSD	Manganese - Total	262	20	None
SW6010	IC-7	MSD	Nickel - Total	30	20	None
SW6010	IC-7	MSD	Potassium - Total	62	20	None
SW6010	IC-7	MSD	Sodium - Total	130	20	None
SW6010	IC-7	MSD	Vanadium - Total	34	20	None
SW6010	IC-7	MSD	Zinc - Total	75	20	None
SW8260	IC-7	MSD	1,1-Dichloroethene	24	22	None
SW8260	IC-7	MSD	Benzene	27	25	None
SW8260	IC-7	MSD	Trichloroethene	31	24	None
SW9056	IC-7-D4-5	MSD	Sulfate	41	20	Diluted Out

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed

Sample ID	Lab ID	Method	Sample Type	Action
IC-6	A5429103	SW8260	SAMP	Report all but Ethylbenzene
IC-6	A5429103RI	SW8260	RE	Report for Ethylbenzene, add J flag.

Table 7 – Summary of Field Duplicate Results
None

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-4322
Broadwater Energy	A05-4426
Broadwater Energy	A05-4619
Broadwater Energy	A05-4630

Sediment and surface water, samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Burlington for total organic carbon, and salinity, and Ambient Group, Inc. for coliform. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 540 reported values in this sample delivery group (SDG), 31 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. All samples were analyzed within holding times except as noted on Table 1.3. The volatiles were analyzed with the method holding time and no qualification is required.

Nitrate and Nitrite, E353.2, soil hold times were evaluated against the water hold time of 2 days. All samples were analyzed within 48 hours of extraction. In some cases, sediment samples may have not been extracted within the 2 day holding time, but this would have minimum on the total nitrate and nitrite results.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of Trichloroethene were detected in the method blank and sample result was qualified as indicated in Table 2A.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blanks are summarized on in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a

concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable.

Laboratory Duplicate or Matrix Spike Duplicates
Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable.

Initial Calibration
In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified

Continuing Calibration
In a number of cases, where the percent difference for a chemical was found to have exceeded the specified limit of 25%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution
Results for several metals (aluminum, manganese, iron and magnesium) were reported with the "E" flag indicating a serial dilution was high. The results were "J" flagged to indicate an estimate. There is no impact on usability because the metals are not a concern for comparison to criteria.

Method Issues
The results for chemical oxygen demand (COD) are much greater than the results for biological oxygen demand (BOD). It is clear that the high levels of chloride interfered with the analysis. The results are flagged "J" as estimated and not indicative of actual COD levels.

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-4322	WATER	C-1-DS-W	A5432201	4/29/2005			None
A05-4322	WATER	C-1-DS-W	A5432201MS	4/29/2005	MS/MSD		None
A05-4322	WATER	C-1-DM-W	A5432202	4/29/2005			None
A05-4322	WATER	C-1-DB-W	A5432203	4/29/2005			None
A05-4322	WATER	C-1-DB-W	A5432203MS	4/29/2005	MS/MSD		None
A05-4426	WATER	C-27-DS-W	A5442601	5/2/2005			None
A05-4426	WATER	C-27-DS-W	A5442601MS	5/2/2005	MS/MSD		None
A05-4426	WATER	C-27-DM-W	A5442602	5/2/2005			None
A05-4426	WATER	C-27-DB-W	A5442603	5/2/2005			None

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-4619	SEDIM	C-12	A5461901	5/4/2005			None
A05-4619	SEDIM	C-12-D4-5	A5461902	5/4/2005			None
A05-4619	SEDIM	C-6	A5461903	5/5/2005			None
A05-4619	SEDIM	C-6-D4-5	A5461904	5/5/2005			None
A05-4630	SEDIM	C-12	A5463001	5/4/2005			None
A05-4630	SEDIM	C-12	A5463001MS	5/4/2005	MS/MSD		None
A05-4630	SEDIM	C-12	A5463001SD	5/4/2005	MS/MSD		None
A05-4630	SEDIM	C-12-D4-5	A5463002	5/4/2005			None
A05-4630	SEDIM	C-6	A5463003	5/5/2005			None
A05-4630	SEDIM	C-6-D4-5	A5463004	5/5/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4322	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-4322	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-4322	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP
A05-4322	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-4322	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4322	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4322	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-4322	WATER	E300	E300 Anions	3	SAMP
A05-4322	WATER	E160.5	E160.5 Settable Solids	3	SAMP
A05-4322	WATER	E160.3	E160.3 Total Residue	3	SAMP
A05-4322	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-4426	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4426	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP
A05-4426	WATER	E160.3	E160.3 Total Residue	3	SAMP
A05-4426	WATER	E160.5	E160.5 Settable Solids	3	SAMP
A05-4426	WATER	E300	E300 Anions	3	SAMP
A05-4426	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-4426	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-4426	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-4426	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-4426	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4426	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-4619	SEDIM	SM2520	SM2520 Salinity	2	SAMP
A05-4619	SEDIM	E415.1	Total Organic Carbon Lloyd Kahn	2	SAMP

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
		Kahn			
A05-4630	SEDIM	SW9045	SW9045 pH	2	SAMP
A05-4630	SEDIM	SW8270	SW8270 SemiVolatiles	2	SAMP
A05-4630	SEDIM	SW8260	SW8260 Volatiles	2	SAMP
A05-4630	SEDIM	SW8082	SW8082 PCBs	2	SAMP
A05-4630	SEDIM	SW8081	SW8081 Pesticides	2	SAMP
A05-4630	SEDIM	SW7471	SW7471 Mercury Total	2	SAMP
A05-4630	SEDIM	E353.2	E353.2 Nitrate/Nitrite	2	SAMP
A05-4630	SEDIM	SW9056	SW9056 Anions	2	SAMP
A05-4630	SEDIM	SW6010	SW6010 Metals Total	2	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Anal HT	Analysis Date	Samp Qual
E353.2	C-12-D4-5	5/6/2005	SEDIM	SAMP	2	5/10/2005	None
E353.2	C-6-D4-5	5/6/2005	SEDIM	SAMP	2	5/10/2005	None
SW8260	C-12	5/6/2005	SEDIM	SAMP	5	5/11/2005	None
SW8260	C-6	5/6/2005	SEDIM	SAMP	5	5/11/2005	None

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0693502	MBLK	Trichloroethene	2	J	A	µg/Kg	0.6	5

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0693502	SEDIM	Trichloroethene	2	1	BJ	4	C-12	U Flag

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits
None

Table 5 - List LCS Recoveries outside Control Limits

Method	Sample ID	Analyte	Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
SW6010	A5463005	Aluminum - Total	77	80	120	2	J Flag due to serial dilution
SW6010	A5463005	Antimony - Total	73	80	120	2	None
SW6010	A5463005	Iron - Total	62	80	120	2	J Flag due to serial dilution
SW6010	A5463005	Magnesium - Total	78	80	120	2	J Flag due to serial dilution
SW6010	A5463005	Sodium - Total	75	80	120	2	None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results
None

Initial out for Dichlorodiflurormethane, 26 %RSD affecting sample C-3d (reportedd as 1 J).

Reference:

ProjectID	Lab Work Order
Broadwater Energy	A05-4348
Broadwater Energy	A05-4349
Broadwater Energy	A05-4352

Sediment samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Knoxville for dioxin, and STL Burlington for total organic carbon, and salinity. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned

when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 396 reported values in this sample delivery group (SDG), 26 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times

Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. All samples were analyzed with holding times except as noted on Table 1.3. Analysis completed within the method holding time as noted does not required qualification.

Two samples were re-analyzed for volatiles because of ethylbenzene calibration. The reanalysis is reported, no qualification is needed because the compound was detected in the original or re-analysis.

Nitrate and Nitrite, E353.2, soil hold times were evaluated against the water hold time of 2 days. All samples were analyzed within 48 hours of extraction. In some cases, sediment samples may have not been extracted within the 2 day holding time, but this would have minimum on the total nitrate and nitrite results.

Method and Calibration Blanks

Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of dioxins, unknowns and acetone were flagged “U” as non-detected as indicated on Table 2A. The other dioxin results slightly above the blank levels were flagged “J” as estimated. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks

Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blank are summarized in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits except one slightly low pesticide surrogate for which no qualification is required.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except for a few pesticides slightly out of control limits. No qualification is required.

Laboratory Duplicate or Matrix Spike Duplicates
Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable except as noted on Tables 4 and 5 for a few pesticides slightly out of control limits. No qualification is required.

Initial Calibration
In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration
In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Dilution/Reanalysis
Samples for VOC and SVOC analysis were re-extracted and analyzed as indicated on Table 6. Samples were processed within holding times except as noted above.

Results for several metals (aluminum, potassium, calcium, manganese, iron and magnesium) were reported with the “E” flag indicating a serial dilution was high. The results were “J” flagged to indicate an estimate. There is no impact on usability because the metals are not a concern for comparison to criteria.

Field Duplicates

Consistency in both sample collection and sample analysis is checked through analysis of duplicate samples. Duplicate samples consist of aliquots of sample media placed in separate sample containers and labeled as separate samples. Duplicate samples were collected at a rate of approximately one per 20 field samples. Table 7 lists the duplicate samples and the original samples they duplicated. Field duplicate, ENV-3D-D4-5, was not analyzed for Salinity due to laboratory oversight. The duplicate samples with precision greater than twice the acceptable analytical precision (70% for sediments and 40% for waters) are qualified “J” as estimated.

The sediment samples collected in duplicate show good precision for all parameters except carbon disulfide and toluene. Carbon disulfide results were later qualified “U” as non-detect due to blank contamination. The associated sample results are flagged “J”.

Tentatively Identified Compounds

The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as “NJ” with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The only significant TICs indicate low level hydrocarbon contaminant in some samples including C-3D. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL
HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-4348	SEDIM	C-3	A5434801	4/28/2005			None
A05-4348	SEDIM	C-3	A5434801MS	4/28/2005	MS/MSD		None
A05-4348	SEDIM	C-3	A5434801RE	4/28/2005			None
A05-4348	SEDIM	C-3	A5434801SD	4/28/2005	MS/MSD		None
A05-4348	SEDIM	C-3-D4-5	A5434802	4/28/2005			None
A05-4348	SEDIM	C-3D	A5434803	4/28/2005			None
A05-4348	SEDIM	C-3D	A5434803MS	4/28/2005	MS/MSD		None
A05-4348	SEDIM	C-3D	A5434803RE	4/28/2005			None
A05-4348	SEDIM	C-3D	A5434803RI	4/28/2005			None
A05-4348	SEDIM	C-3D	A5434803SD	4/28/2005	MS/MSD		None
A05-4348	SEDIM	C-3D-D4-5	A5434804	4/28/2005			None
A05-4348	SEDIM	C-1	A5434805	4/29/2005			None
A05-4348	SEDIM	C-1	A5434805RE	4/29/2005			None
A05-4348	SEDIM	C-1	A5434805RI	4/29/2005			None
A05-4348	SEDIM	C-1-D4-5	A5434806	4/29/2005			None
A05-4349	SEDIM	C-1-D3-4	A5434903	4/29/2005			None
A05-4352	SEDIM	C-3	A5435201	4/28/2005			None

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD	ID Corrections
A05-4352	SEDIM	C-3-D4-5	A5435202	4/28/2005			None
A05-4352	SEDIM	C-3D	A5435203	4/28/2005			None
A05-4352	SEDIM	C-3D-D4-5	A5435204	4/28/2005			None
A05-4352	SEDIM	C-1	A5435205	4/29/2005			None
A05-4352	SEDIM	C-1-D4-5	A5435206	4/29/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4348	SEDIM	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4348	SEDIM	SW6010	SW6010 Metals Total	3	SAMP
A05-4348	SEDIM	SW7471	SW7471 Mercury Total	3	SAMP
A05-4348	SEDIM	SW8081	SW8081 Pesticides	3	SAMP
A05-4348	SEDIM	SW8082	SW8082 PCBs	3	SAMP
A05-4348	SEDIM	SW8260	SW8260 Volatiles	2	RE
A05-4348	SEDIM	SW8260	SW8260 Volatiles	3	SAMP
A05-4348	SEDIM	SW8270	SW8270 SemiVolatiles	3	RA
A05-4348	SEDIM	SW9045	SW9045 pH	3	SAMP
A05-4348	SEDIM	SW9056	SW9056 Anions	3	SAMP
A05-4349	SEDIM	SM1613B	SM1613B Dioxins	1	SAMP
A05-4352	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	3	SAMP
A05-4352	SEDIM	SM2520	SM2520 Salinity	3	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
E353.2	C-1-D4-5	4/30/2005	SEDIM	SAMP			2	5/4/2005	None
E353.2	C-3-D4-5	4/30/2005	SEDIM	SAMP			2	5/4/2005	None
E353.2	C-3D-D4-5	4/30/2005	SEDIM	SAMP			2	5/4/2005	None
SW8260	C-1	4/30/2005	SEDIM	RE			5	5/17/2005	None
SW8260	C-3	4/30/2005	SEDIM	SAMP			5	5/5/2005	Within Method HT
SW8260	C-3D	4/30/2005	SEDIM	RE			5	5/17/2005	None
SW8270	C-1	4/30/2005	SEDIM	RA	5	5/5/2005	40	5/6/2005	Within Method HT
SW8270	C-3	4/30/2005	SEDIM	RA	5	5/5/2005	40	5/6/2005	Within Method HT
SW8270	C-3D	4/30/2005	SEDIM	RA	5	5/5/2005	40	5/6/2005	Within Method HT

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0647302	MBLK	1,1-DIFLUOROETHANE	17	JN	T	µg/Kg		
SW8260	A5B0647302	MBLK	Acetone	30		A	µg/Kg	22	25
SW8260	A5B0647302	MBLK	Chloromethane	1	J	A	µg/Kg	0.7	5
SW8260	A5B0655102	MBLK	1,1-DIFLUOROETHANE	52	JN	T	µg/Kg		
SW8260	A5B0746002	MBLK	1,1-DIFLUOROETHANE	13	JN	T	µg/Kg		
SW8260	A5B0746004	MBLK	1,1-DIFLUOROETHANE	41	JN	T	µg/Kg		
SW8260	A5B0746004	MBLK	Bromomethane	1	J	A	µg/Kg	1	5
SW8260	A5B0746004	MBLK	Chloromethane	1	J	A	µg/Kg	0.7	5

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0647302	SEDIM	Acetone	30	32	B	25	C-1	U Flag
SW8260	A5B0647302	SEDIM	Acetone	30	22	BJ	25	C-3D	U Flag
SW8260	A5B0655102	SEDIM	1,1-DIFLUOROETHANE	52	11	BJN		C-3	U Flag

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-4349	SM1613B	C-1-D3-4	1,2,3,4,6,7,8-HpCDF	0.00000048	BJ	U
A05-4349	SM1613B	C-1-D3-4	OCDD	0.000057	B	J
A05-4349	SM1613B	C-1-D3-4	OCDF	0.0000018	BJ	U

Table 2B - List of Samples Qualified for Field Blank Contamination

None

Table 3 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac	Sample Qual.
SW8081	C-1	SAMP	Tetrachloro-m-xylene	36	38	132	1	None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.	REPORTABLE
SW8081	C-3	MS	alpha-BHC	<0.40	25.9	45	1	47	123	None	Yes

Method	Sample ID	Sample Type	Analyte	RPD	RPD Limit	Sample Qual.
SW8081	C-3	MSD	4,4'-DDE	37	30	None
SW8081	C-3	MSD	4,4'-DDT	38	30	None
SW8081	C-3	MSD	Aldrin	47	30	None
SW8081	C-3	MSD	alpha-BHC	52	30	None
SW8081	C-3	MSD	beta-BHC	33	30	None
SW8081	C-3	MSD	delta-BHC	37	30	None
SW8081	C-3	MSD	Endosulfan I	36	30	None
SW8081	C-3	MSD	gamma-BHC (Lindane)	50	30	None
SW8081	C-3	MSD	Heptachlor	50	30	None
SW8081	C-3	MSD	Heptachlor epoxide	37	30	None
SW8081	C-3	MSD	Methoxychlor	33	30	None

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed

Sample ID	Lab ID	Method	Sample Type	Action
C-3	A5434801RE	SW8270	RA	Report
C-1	A5434805RE	SW8270	RA	Report
C-3D	A5434803RE	SW8270	RA	Report
C-3D	A5434803	SW8260	SAMP	Report all but Ethylbenzene
C-3D	A5434803RI	SW8260	RE	Report for Ethylbenzene only, add J flag
C-1	A5434805	SW8260	SAMP	Report all but Ethylbenzene
C-1	A5434805RI	SW8260	RE	Report for Ethylbenzene only, add J flag

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Anal Type	PQL	C-3	C-3D	RPD	RPD Rating	Samp Qual
SW8260	Acetone	µg/Kg	A	25	NA	22	NC		
SW8260	Carbon Disulfide	µg/Kg	A	5	3	1	100.0%	Poor	J Flag

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: Marcia Meredith Galloway

Method	Analyte	Unit	Anal Type	PQL	C-3	C-3D	RPD	RPD Rating	Samp Qual
SW8260	Dichlorodifluoromethane	µg/Kg	A	5	NA	1	NC		
SW8260	Toluene	µg/Kg	A	5	4	54	172.4%	Poor	J Flag
SW8260	1,1-DIFLUOROETHANE	µg/Kg	T		11	NA	NC		
SW8260	3-METHYLPENTANE	µg/Kg	T		NA	5	NC		
SW8260	HEXAMETHYLCYCLOTRISILOXANE	µg/Kg	T		NA	5	NC		
SW8260	HEXANE	µg/Kg	T		NA	9	NC		
SW8260	TRIMETHYLSILANOL	µg/Kg	T		6	5	18.2%	Good	None
SW8260	UNSATURATED HYDROCARBON	µg/Kg	T		NA	12	NC		
SW7471	Mercury - Total	mg/Kg	A	0.016	0.026	0.063	83.1%	Poor	J Flag
SW6010	Aluminum - Total	mg/Kg	A	7.8	7550	4900	42.6%	Good	None
SW6010	Arsenic - Total	mg/Kg	A	1.6	3.6	4.3	17.7%	Good	None
SW6010	Barium - Total	mg/Kg	A	0.39	22.6	14.8	41.7%	Good	None
SW6010	Beryllium - Total	mg/Kg	A	0.16	0.40	0.25	46.2%	Good	None
SW6010	Calcium - Total	mg/Kg	A	15.6	2070	1410	37.9%	Good	None
SW6010	Chromium - Total	mg/Kg	A	0.39	16.0	12.2	27.0%	Good	None
SW6010	Cobalt - Total	mg/Kg	A	0.39	6.3	4.8	27.0%	Good	None
SW6010	Copper - Total	mg/Kg	A	0.78	7.8	10.6	30.4%	Good	None
SW6010	Iron - Total	mg/Kg	A	7.8	14600	9480	42.5%	Good	None
SW6010	Lead - Total	mg/Kg	A	0.78	5.7	6.5	13.1%	Good	None
SW6010	Magnesium - Total	mg/Kg	A	15.6	5460	3360	47.6%	Good	None
SW6010	Manganese - Total	mg/Kg	A	0.16	326	214	41.5%	Good	None
SW6010	Nickel - Total	mg/Kg	A	0.39	11.9	8.8	30.0%	Good	None
SW6010	Potassium - Total	mg/Kg	A	23.4	2580	1550	49.9%	Good	None
SW6010	Sodium - Total	mg/Kg	A	109	4940	3120	45.2%	Good	None
SW6010	Vanadium - Total	mg/Kg	A	0.39	22.9	14.8	43.0%	Good	None
SW6010	Zinc - Total	mg/Kg	A	1.6	34.3	30.4	12.1%	Good	None
E415.1 Kahn	Total Organic Carbon	mg/Kg	A	796	6370	7950	22.1%	Good	None

Method	Analyte	Unit	Anal Type	PQL	C-3-D4-5	C-3D-D4-5	RPD	RPD Rating	Samp Qual
SW9056	Chloride	mg/Kg	A	25.0	9440	7680	20.6%	Good	None
SW9056	Sulfate	mg/Kg	A	20.0	281	1270	127.5%	Poor	J Flag
SW9045	Leachable pH	S.U.	A	0.0100	7.89	8.45	6.9%	Good	None

Method	Analyte	Unit	Anal Type	PQL	C-3-D4-5	C-3D-D4-5	RPD	RPD Rating	Samp Qual
SM2520	Salinity	S	A	2.0	5.4	5.8	7.1%	Good	None

Key:
- A = Analyte
- NC = Not Calculated
- ND = Not Detected
- PQL = Practical Quantitation Limit
- RPD = Relative Percent Difference
- T = Tentatively Identified Compound

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

See Narrative for 8081 and 8082

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-4390
Broadwater Energy	A05-4391
Broadwater Energy	A05-4392

Sediment and surface water samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Burlington total organic carbon, and salinity, and Ambient Group, Inc. for coliform. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned

when an analyte was considered non-detect due to blank contamination. If the result is above the PQL the PQL is considered elevated.

Out of a total of 687 reported values in this sample delivery group (SDG), 8 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times

Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. All samples were analyzed within holding times.

Method and Calibration Blanks

Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of one unknown was detected in the method blank and qualified in the associated sample. Low levels of dioxins were detected slightly above the blank levels and were flagged "J" as estimated.

The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks

Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blanks are summarized on in the DUSR for SDG 3.

Surrogate Spikes

Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits except as noted for several pesticide and PCB surrogates. No qualification is required for one surrogate out for pesticides or PCBs.

Spike Samples

Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable.

Laboratory Duplicate or Matrix Spike Duplicates
Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable.

Initial Calibration
In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration
In a number of cases, where the percent difference for a chemical was found to have exceeded the specified limit of 25%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Tentatively Identified Compounds
The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as "NJ" with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The only significant TICs indicate low level hydrocarbon contaminant in some samples including IC-5. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL
HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Method Issues
The results for COD are much greater than the results for biological oxygen demand (BOD). It is clear that the high levels of chloride interfered with the analysis. The results are flagged "J" as estimated and not indicative of actual COD levels.

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD MS	ID Corrections
A05-4390	WATER	C-28-DS-W	A5439001	5/2/2005			None
A05-4390	WATER	C-28-DM-W	A5439002	5/2/2005			None
A05-4390	WATER	C-28-DB-W	A5439003	5/2/2005			None
A05-4390	WATER	C-28-DB-W	A5439003MS	5/2/2005	MS/MSD		None
A05-4390	SEDIM	IC-5	A5439004	4/29/2005			None
A05-4390	SEDIM	IC-5-D2-2.7	A5439005	4/29/2005			None
A05-4390	SEDIM	IC-14	A5439006	4/30/2005			None
A05-4390	SEDIM	IC-14-D4-5	A5439007	4/30/2005			None
A05-4390	SEDIM	IC-13	A5439008	4/30/2005			None
A05-4390	SEDIM	IC-13-D2-2.7	A5439009	4/30/2005			None
A05-4390	SEDIM	IC-13-D2-2.7	A5439009MS	4/30/2005	MS/MSD		None
A05-4390	SEDIM	C-21	A5439010	5/1/2005			None
A05-4390	SEDIM	C-21-D2.4-3.4	A5439011	5/1/2005			None
A05-4390	SEDIM	C-22	A5439012	5/1/2005			None
A05-4390	SEDIM	C-22-D3-4	A5439013	5/1/2005			None
A05-4391	SEDIM	IC-13-D0-1	A5439103	4/30/2005			None
A05-4392	SEDIM	IC-5	A5439201	4/29/2005			None
A05-4392	SEDIM	IC-5-D2-2.7	A5439202	4/29/2005			None
A05-4392	SEDIM	IC-14	A5439203	4/30/2005			None
A05-4392	SEDIM	IC-14-D4-5	A5439204	4/30/2005			None
A05-4392	SEDIM	IC-13	A5439205	4/30/2005			None
A05-4392	SEDIM	IC-13-D2-2.7	A5439206	4/30/2005			None
A05-4392	SEDIM	C-21	A5439207	5/1/2005			None
A05-4392	SEDIM	C-21-D2.4-3.4	A5439208	5/1/2005			None
A05-4392	SEDIM	C-22	A5439209	5/1/2005			None
A05-4392	SEDIM	C-22-D3-4	A5439210	5/1/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4390	SEDIM	E353.2	E353.2 Nitrate/Nitrite	5	SAMP
A05-4390	SEDIM	SW6010	SW6010 Metals Total	5	SAMP
A05-4390	SEDIM	SW7471	SW7471 Mercury Total	5	SAMP
A05-4390	SEDIM	SW8081	SW8081 Pesticides	5	SAMP
A05-4390	SEDIM	SW8082	SW8082 PCBs	5	SAMP
A05-4390	SEDIM	SW8260	SW8260 Volatiles	5	SAMP
A05-4390	SEDIM	SW8270	SW8270 SemiVolatiles	5	SAMP
A05-4390	SEDIM	SW9045	SW9045 pH	5	SAMP
A05-4390	SEDIM	SW9056	SW9056 Anions	5	SAMP
A05-4390	WATER	E160.2	E160.2 Total Suspended Solids, Non-filterable Residue	3	SAMP
A05-4390	WATER	E160.3	E160.3 Total Residue	3	SAMP
A05-4390	WATER	E160.5	E160.5 Settable Solids	3	SAMP

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4390	WATER	E300	E300 Anions	3	SAMP
A05-4390	WATER	E350.1	E350.1 Ammonia	3	SAMP
A05-4390	WATER	E351.3	Total Kjeldahl Nitrogen (TKN)	3	SAMP
A05-4390	WATER	E353.2	E353.2 Nitrate/Nitrite	3	SAMP
A05-4390	WATER	E365.2	E365.2 Total Phosphorus	3	SAMP
A05-4390	WATER	E405.1	E405.1 Biochemical Oxygen Demand (BOD)	3	SAMP
A05-4390	WATER	E410.4	E410.4 Chemical Oxygen Demand (COD)	3	SAMP
A05-4390	WATER	SMTSS-SS	Colloidal Solids	3	SAMP
A05-4391	SEDIM	SM1613B	SM1613B Dioxins	1	SAMP
A05-4392	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	5	SAMP
A05-4392	SEDIM	SM2520	SM2520 Salinity	5	SAMP

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0655102	MBLK	1,1-DIFLUOROETHANE	52	JN	T	µg/Kg		

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0655102	SEDIM	1,1-DIFLUOROETHANE	52	8	BJN		IC-14	U Flag

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-4391	SM1613B	IC-13-D0-1	1,2,3,4,6,7,8-HpCDF	0.000015	B	J
A05-4391	SM1613B	IC-13-D0-1	OCDD	0.00032	B	J
A05-4391	SM1613B	IC-13-D0-1	OCDF	0.000033	B	J

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Sample Type	Analyte	Rec.	Low Limit	High Limit	Dil Fac	Sample Qual.
SW8082	IC-14	SAMP	Tetrachloro-m-xylene	21	32	148	1	None
SW8081	C-22	SAMP	Tetrachloro-m-xylene	30	38	132	1	None
SW8081	IC-14	SAMP	Tetrachloro-m-xylene	22	38	132	1	None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits
None

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results
None

Data Usability Summary Report	Project: Broadwater
Date Completed: June 2005	Completed by: R. Humphrey/M. Galloway

Reference:

Project ID	Lab Work Order
Broadwater Energy	A05-4541
Broadwater Energy	A05-4543
Broadwater Energy	A05-4544

Sediment samples were collected from various locations as noted on Table 1.1 below. The samples were submitted to STL Buffalo for general environmental analysis, STL Knoxville for dioxin, and STL Burlington for total organic carbon, and salinity. All laboratories were approved by NYS ELAP for the analysis. Analytical data reports generated by the laboratory were checked to verify that data reported are consistent with the requirements of the Quality Assurance Project Plan (QAPP) and the appropriate methods from the NYSDEC ASP, June 2000. The data review included an evaluation of the following:

- Holding times;
- Initial and continuing calibration;
- Laboratory blanks;
- Field blanks;
- Surrogate Recoveries;
- MS/MSD samples;
- Laboratory control samples ([LCS], same as matrix spike blanks);
- Laboratory duplicates;
- Field duplicates;
- Sample result verification; and
- Method-specific QC samples (e.g., GC/MS tunes).

Any deviations from acceptable QC specifications are provided Tables 2 through 7 and discussed below. Appropriate qualifiers to the data to indicate potential concerns with data usability were added as follows:

J - The qualifier indicates an estimated value because the associated QC data indicated a potential laboratory or matrix problem or interference. In addition, J flags assigned by the laboratory indicate the results are below the practical quantitation limit (PQL), but above the instrument detection limit (IDL) or method detection limit (MDL).

U - The result is considered non-detect. The laboratory assigned this flag to analytes not present at detectable concentrations (above the IDL or MDL). This flag was assigned when an analyte was considered non-detect due to blank contamination. If the result is above the PQL, the PQL is considered elevated.

Out of a total of 792 reported values in this sample delivery group (SDG), 10 values were qualified during the data validation process. The data points that were qualified as estimated or nondetect are considered useable for the purposes of this project. None of values were flagged as unusable resulting in a completeness of 100%. In general, potential data limitations for the site are minor, as noted below:

Holding Times
Holding times are established by the NYSDEC ASP to ensure samples are analyzed within the contract required period. The NYSDEC ASP holding times are shorter than the method holding times. The data was evaluated relative to the method holding time. The method holding time indicates a potential change to the analyte over time. Data are not usable if gross violations of holding time (two times the method holding time) are found. All samples were analyzed with holding times except as noted on Table 1.3. Analysis completed within the method holding time as noted does not required qualification.

Nitrate and Nitrite, E353.2, soil hold times were evaluated against the water hold time of 2 days. All samples were analyzed within 48 hours of extraction. In some cases, sediment samples may have not been extracted within the 2 day holding time, but this would have minimum on the total nitrate and nitrite results.

Method and Calibration Blanks
Quality checks on the laboratory equipment, instrumentation, and methods reagents are conducted by analysis of method blanks. Method blanks consist of organic-free deionized water subjected to every step of the analytical process to determine possible points of laboratory contaminant introduction. Instrument calibration blanks are pure reagent matrix analyzed compared to set instrument response baselines.

One method blank per 20 samples was analyzed, while one calibration blank was analyzed for each analytical run. Blanks showed minor contamination as noted on Table 2.
Low levels of dioxins, unknowns and trichloroethene were flagged “U” as non-detected as indicated on Table 2A. The other dioxin results slightly above the blank levels were flagged “J” as estimated. The results below the reporting limit were elevated to the reporting limit. The results were generally below the reporting limit and, therefore, the data qualification has no impact on the data usability.

Field Blanks
Rinsate samples were collected to check the effectiveness of the decontamination process on sampling equipment. Because most of the equipment was dedicated only one rinsate was collected from a complete set of equipment to assess any background contamination. Contaminants detected in the rinsate blank are summarized in the DUSR for SDG 3.

Surrogate Spikes
Surrogate spikes are added to all organic methods to assess the recovery of individual samples. Surrogate for samples and MS/MSD outside control limits are summarized on Table 3. All samples should be re-analyzed for if any VOC surrogate is out or is more than one base neutral and acid surrogate is out for SVOCs. The laboratory should establish matrix effects. There were no surrogate recoveries outside of control limits.

Spike Samples
Spike samples simulate the background effect and interferences found in the actual samples, and the calculated percent recovery of the spike is used as a measure of the accuracy of the total analytical method. Spike samples were prepared by adding to an environmental sample

(before extraction or digestion) a known amount of pure analyte to be assayed. The percent recovery of the spike analyte measures the accuracy of the method. Spikes were added at a concentration approximately midpoint on the calibration curve. Spikes (e.g., laboratory control samples) added to a matrix blank were analyzed with each sample batch to assess analytical performance not affected by sample matrix. If matrix spike samples indicated a potential matrix effect, the matrix spike blanks were evaluated to verify the problems were not due to an analytical concern. All sediment and aqueous matrix spikes evaluations were acceptable except for a chloride. No qualification is required because the spike amount was less than 4 times the sample result.

Laboratory Duplicate or Matrix Spike Duplicates
Laboratory or matrix spike duplicates are aliquots of the same sample that are split prior to analysis and are treated exactly the same throughout the analytical method. The relative percent difference between the values of the MS and MSD or between the original and the duplicate was taken as a measure of the precision of the analytical method. MS/MSD samples were collected at a rate of one per 20 field samples for standard matrices. All sediment duplicate evaluations were acceptable.

Initial Calibration
In a number of cases, where the relative standard deviation (%RSD) for a chemical was found to have exceeded the specified limit of 15%, but there were no associated positive sample results. In all cases the average %RSD is acceptable. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Continuing Calibration
In a number of cases, where the percent difference (%D) for a chemical was found to have exceeded the specified limit of 20%, but there were no associated positive sample results. The calibration results were high enough to support the reporting limits and no non-detectable results were qualified.

Tentatively Identified Compounds
The laboratory reported tentatively identified compounds (TICs) for volatile and semivolatile compounds on the hard copy data package. TIC values are reported as "NJ" with presumptive evidence that the compounds are present and concentrations are considered highly estimated. The TICs were reviewed to determine any indications of significant contamination not identified by the results for the known target compounds. The following TICs were found in at least one blank and are considered related to system background. The TIC results were flagged U as non-detect.

TRIMETHYLSILANOL
HEXAMETHYLCYCLOTRISILOXANE
BENZENEDICARBOXYLIC ACID DER
1,1-DIFLUOROETHANE

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD MS	ID Corrections
A05-4541	SEDIM	C-26	A5454101	5/3/2005			None
A05-4541	SEDIM	C-26	A5454101MS	5/3/2005	MS/MSD		None
A05-4541	SEDIM	C-26	A5454101SD	5/3/2005	MS/MSD		None
A05-4541	SEDIM	C-26-D4-5	A5454102	5/3/2005			None

Table 1.1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	MS/MSD MS	ID Corrections
A05-4541	SEDIM	C-24	A5454103	5/3/2005			None
A05-4541	SEDIM	C-24-D4-5	A5454104	5/3/2005			None
A05-4541	SEDIM	C-23	A5454105	5/3/2005			None
A05-4541	SEDIM	C-23-D4-5	A5454106	5/3/2005			None
A05-4541	SEDIM	C-25	A5454107	5/4/2005			None
A05-4541	SEDIM	C-25-D4-5	A5454108	5/4/2005			None
A05-4541	SEDIM	C-28	A5454109	5/2/2005			None
A05-4541	SEDIM	C-28-D4-5	A5454110	5/2/2005			None
A05-4541	SEDIM	C-27	A5454111	5/2/2005			None
A05-4541	SEDIM	C-27-D4-5	A5454112	5/2/2005			None
A05-4541	SEDIM	C-27-D4-5	A5454112MS	5/2/2005	MS/MSD		None
A05-4543	SEDIM	C-24-D5-6	A5454301	5/3/2005			None
A05-4543	SEDIM	C-28-D2-3	A5454302	5/2/2005			None
A05-4544	SEDIM	C-26-D4-5	A5454401	5/3/2005			None
A05-4544	SEDIM	C-24-D4-5	A5454402	5/3/2005			None
A05-4544	SEDIM	C-23-D4-5	A5454403	5/3/2005			None
A05-4544	SEDIM	C-25-D4-5	A5454404	5/4/2005			None
A05-4544	SEDIM	C-28-D4-5	A5454405	5/2/2005			None
A05-4544	SEDIM	C-27-D4-5	A5454406	5/2/2005			None
A05-4544	SEDIM	C-26	A5454407	5/3/2005			None
A05-4544	SEDIM	C-24	A5454408	5/3/2005			None
A05-4544	SEDIM	C-23	A5454409	5/3/2005			None
A05-4544	SEDIM	C-25	A5454410	5/4/2005			None
A05-4544	SEDIM	C-28	A5454411	5/2/2005			None
A05-4544	SEDIM	C-27	A5454412	5/2/2005			None

Table 1.2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples	SampType
A05-4541	SEDIM	E353.2	E353.2 Nitrate/Nitrite	6	SAMP
A05-4541	SEDIM	SW6010	SW6010 Metals Total	6	SAMP
A05-4541	SEDIM	SW7471	SW7471 Mercury Total	6	SAMP
A05-4541	SEDIM	SW8081	SW8081 Pesticides	6	SAMP
A05-4541	SEDIM	SW8082	SW8082 PCBs	6	SAMP
A05-4541	SEDIM	SW8260	SW8260 Volatiles	6	SAMP
A05-4541	SEDIM	SW8270	SW8270 SemiVolatiles	6	SAMP
A05-4541	SEDIM	SW9045	SW9045 pH	6	SAMP
A05-4541	SEDIM	SW9056	SW9056 Anions	6	SAMP
A05-4543	SEDIM	SM1613B	SM1613B Dioxins	2	SAMP
A05-4544	SEDIM	E415.1 Kahn	Total Organic Carbon Lloyd Kahn	6	SAMP
A05-4544	SEDIM	SM2520	SM2520 Salinity	6	SAMP

Table 1.3 Holding Time Exceptions

Method	Sample ID	Date Received	Matrix	Sample Type	Prep HT	Prep Date	Anal HT	Analysis Date	Samp Qual
E353.2	C-23-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
E353.2	C-24-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
E353.2	C-25-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
E353.2	C-26-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
E353.2	C-27-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
E353.2	C-28-D4-5	5/5/2005	SEDIM	SAMP			2	5/7/2005	None
SW8260	C-24	5/5/2005	SEDIM	SAMP			5	5/11/2005	Within Method
SW8260	C-28	5/5/2005	SEDIM	SAMP			5	5/11/2005	Within Method

The following tables provide summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Table 2 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	MDL	PQL
SW8260	A5B0693502	MBLK	SATURATED HYDROCARBON	15	J	T	µg/Kg		
SW8260	A5B0693502	MBLK	SATURATED HYDROCARBON	6	J	T	µg/Kg		
SW8260	A5B0693502	MBLK	Trichloroethene	2	J	A	µg/Kg	0.6	5
SW8260	A5B0706704	MBLK	HEXAMETHYLCYCLOTRISILOXANE	8	JN	T	µg/Kg		
SW8260	A5B0706704	MBLK	OCTAMETHYLCYCLOTETRASILOXANE	5	JN	T	µg/Kg		

Table 2A - List of Samples Qualified for Method Blank Contamination

Method	Lab Blank	Matrix	Analyte	Blank Result	Sample Result	Lab Qual	PQL	Affected Samples	Sample Flag
SW8260	A5B0693502	SEDIM	SATURATED HYDROCARBON	15	10	BJ		C-28	U Flag
SW8260	A5B0693502	SEDIM	SATURATED HYDROCARBON	15	12	BJ		C-24	U Flag
SW8260	A5B0693502	SEDIM	Trichloroethene	2	1	BJ	5	C-24	U Flag
SW8260	A5B0706704	SEDIM	HEXAMETHYLCYCLOTRISILOXANE	8	6	BJN		C-27	U Flag

Lab Order	Method	Sample ID	Analyte	Result	Lab Qualifier	Validation Qualifier
A05-4543	SM1613B	C-24-D5-6	1,2,3,4,6,7,8-HpCDF	0.0000012	BJ	J
A05-4543	SM1613B	C-24-D5-6	OCDD	0.00040	B	J
A05-4543	SM1613B	C-24-D5-6	OCDF	0.0000028	BJ	U

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Sample ID	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.
SW9056	C-27-D4-5	MS	Chloride	13300	865	128	10	73	114	4X

Table 5 - List LCS Recoveries outside Control Limits
None

Table 6 –Samples that were Reanalyzed
None

Table 7 – Summary of Field Duplicate Results
None